



SMITHSONIAN MATHEMATICAL TABLES

# HYPERBOLIC FUNCTIONS

PREPARED BY

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## ADVERTISEMENT.

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Among the early publications of the Smithsonian Institution was a very important volume of meteorological tables by Dr. Arnold Guyot. They were so widely used by geographers and physicists as well as by meteorologists that when the fourth edition was exhausted it was decided to recast the entire work and publish three separate volumes, Meteorological Tables, Geographical Tables, and Physical Tables, each of which has now passed through several editions.

In the application of the data of these volumes to the study of natural phenomena certain mathematical tables beside those included in ordinary tables of logarithms are urgently needed in order to save recurrent computation on the part of observers and investigators. It was therefore decided to publish the present volume of Mathematical Tables, on Hyperbolic Functions.

Hyperbolic Functions are extremely useful in every branch of pure physics and in the applications of physics whether to observational and experimental sciences or to technology. Thus whenever an entity (such as light, velocity, electricity, or radioactivity) is subject to gradual extinction or absorption, the decay is represented by some form of Hyperbolic Functions. Mercator's projection is likewise computed by Hyperbolic Functions. Whenever mechanical strains are regarded as great enough to be measured they are most simply expressed in terms of Hyperbolic Functions. Hence geological deformations invariably lead to such expression, and it is for that reason that Messrs. Becker and Van Orstrand, who are in charge of the physical work of the United States Geological Survey, have been led to prepare this volume.

CHARLES D. WALCOTT, *Secretary*.

WASHINGTON, D. C., April, 1909.

In this first reprint of the Hyperbolic Functions a few misprints of trifling importance have been corrected and four values of the exponential have been changed by a unit in the eighth significant place.

April, 1911.

C. D. W.

In the second reprint of these Tables, several additional minor corrections have been made, usually in the last decimal place.

November, 1920.

C. D. W.





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## DEFINITIONS AND FORMULAS.

The hyperbolic functions are named the hyperbolic sine, cosine, tangent, cotangent, secant, and cosecant from their close analogy to the circular functions, the tangent being the ratio of the hyperbolic sine to the cosine and the other three functions being reciprocals of these, as in circular trigonometry. They are usually denoted by adding *h* to the symbols of the circular functions, as  $\cosh u$  for the hyperbolic cosine of *u*,  $\sinh u$  for the hyperbolic sine of *u*, etc.<sup>1</sup>

Historically speaking, the hyperbolic functions were evolved from studies of the hyperbola. They might have been developed from the geometry of the ellipse or the catenary or that of other curves. These functions, however, may be considered independently of any geometrical interpretation and can be derived from very fundamental functional theorems.

At least two methods have been devised of defining circular and hyperbolic functions analytically. One of these is due to Mr. Yvon Villaree, and is so extremely brief that it can be given here in a somewhat modified form.

It has long been known that

$$e^{2\pi i} = 1; e^u + 2\pi i = e^u; e^{(u + 2\pi i)i} = e^{iu}.$$

The second of these equations has a single imaginary period,  $2i\pi$ , and the third a single real period,  $2\pi$ . Hence every exponential  $e^u$  in which *u* is real has a single imaginary period,  $2i\pi$ , and every exponential with the same base, but with an imaginary exponent, has a real period,  $2\pi$ . Now, all real purely circular functions may be expressed in terms of constants and exponentials with purely imaginary exponents, and all real hyperbolic functions may be expressed in terms of constants and exponentials with exclusively real exponents.

Hence hyperbolic functions may be defined as the singly periodic exponential functions with real exponents. The circular functions are then the singly periodic exponential functions with imaginary exponents.

It remains to be considered how, from this point of view, the hyperbolic functions of complex variables are to be regarded. The question almost answers itself; for

$$e^{x+iy} = e^x \cdot e^{iy},$$

<sup>1</sup> More compendious and convenient, but less usual, is the notation employed by B. de Saint-Venant,  $\sinh u$ ,  $\cosh u$ ,  $\tanh u$ .

<sup>2</sup> Comptes Rendus, Paris, vol. 83, 1876, p. 594.

which is evidently the product of two functions—one circular, the other hyperbolic. Such functions have a real period and an imaginary one, but since they are single-valued they are not elliptic functions.

The circular and hyperbolic functions being defined as above, it is merely as a matter of convenience that a few of the simpler combinations of exponentials receive special names, as sine, cosine, etc.

The other analytical method of generalizing the two classes of functions is due to Edward Lucas,<sup>1</sup> and is too long to be given here in full, but the method may be indicated. If  $a$  and  $b$  are the two roots of the equation

$$x^2 - Px + Q = 0,$$

where  $P$  and  $Q$  are positive or negative whole numbers, then two functions may be defined as follows:

$$U_n \equiv \frac{a^n - b^n}{a - b}; \quad V_n \equiv a^n + b^n,$$

and these functions are related by the equation

$$U_{2n} = U_n V_n.$$

Lucas develops and studies these functions, limiting  $n$  at first to whole positive numbers. He finds that all the theorems resulting from this study are converted into those of ordinary trigonometry when  $U$  is replaced by  $2 \sin u$  and  $V$  by  $2 \cos u$ . He infers that between the limits 1 and minus 1,  $u$  may be replaced by any real value, and shows that the theorems dealing with  $U$  and  $V$  when translated into trigonometric formulas on this assumption can be verified. By substituting for  $u$  an imaginary argument, the hyperbolic functions also are found to be comprehended in the general functions  $U$  and  $V$ .

Both the circular and hyperbolic functions may further be regarded as integrals of the equation

$$\frac{d}{dx} \log \frac{dy}{dx} = \frac{d}{dx} \log y, \text{ or } \frac{dy}{dx} = cy.$$

If  $c = a^2$ , this gives

$$\frac{y}{a} = Ae^x + Be^{-x},$$

where  $A$  and  $B$  are arbitrary constants; so that the integral expression includes  $\sinh x$ ,  $\cosh x$ , and the sum or difference of these functions.

If  $c = -b^2$ ,

$$\frac{y}{b} = A_1 \cos x + B_1 \sin x.$$

<sup>1</sup> Am. Jour. of Math., vol. 1, 1878, p. 184.

The hyperbolic functions may also be defined geometrically with reference to any hyperbola.

Let  $OA = a$ ,  $OB = b$  be the semi-axes of the hyperbola  $AP$ , and its conjugate  $BP'$  referred to the rectangular axes  $ox$  and  $oy$ . The argument or independent variable  $u$  and its functions are then given by:<sup>1</sup>

$$u = \frac{\text{sector } OAP}{\Delta OAB}, \quad \sinh u = \frac{\Delta OAP}{\Delta OAB}$$

$$\cosh u = \frac{\Delta OPB}{\Delta OAB} \text{ etc.}$$

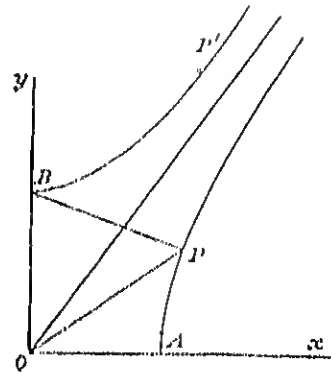


FIG. 1.

The areas of the triangles  $OAB$ ,  $OAP$ , and  $OPB$  are respectively  $\frac{1}{2}ab$ ,  $\frac{1}{2}ay$  and  $\frac{1}{2}bx$ , and the area of the sector  $OAP$  is found from the equation of the hyperbola,

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1,$$

to be

$$S = \frac{ab}{2} \log \left( \frac{x}{a} + \frac{y}{b} \right).$$

Hence, in accordance with the above definitions,

$$u = \frac{2S}{ab} = \log \left( \frac{x}{a} + \frac{y}{b} \right),$$

$$\sinh u = \frac{y}{b} = \frac{1}{2} (e^u - e^{-u}),$$

$$\cosh u = \frac{x}{a} = \frac{1}{2} (e^u + e^{-u}).$$

Similarly the argument and functions of circular trigonometry are:

$$\theta = \frac{2S}{a^2} = \frac{\text{arc}}{\text{radius}},$$

$$\sin \theta = \frac{y}{r} = \frac{1}{2} i (e^{i\theta} - e^{-i\theta}),$$

$$\cos \theta = \frac{x}{r} = \frac{1}{2} (e^{i\theta} + e^{-i\theta}).$$

A comparison of the preceding equations shows that there exist between the two sets of arguments and functions many interesting analogies and relations. The arguments are in each case the ratio of two areas, although the argument of the circular functions may also be defined as a ratio of two lines;

<sup>1</sup> For definitions which are independent of the position of the sectorial areas see Prof. James McMahon's "Hyperbolic Functions" and a paper "On the Introduction of the Notion of Hyperbolic Functions," by Prof. M. W. Haskell, Bull. Am. Math. Soc., vol. 1, 1894-95.

the hyperbolic functions stand in the same relation to the *equilateral* hyperbola as the circular functions do to the circle; each set of functions may be defined analytically as a particular branch of the theory of the exponential function, and it is possible to pass from the one to the other by means of the imaginary  $i = \sqrt{-1}$ . For example,

$$\begin{aligned}\sinh u &= -i \sin iu, \\ \cosh u &= \cos iu, \\ \tanh u &= -i \tan iu.\end{aligned}$$

Furthermore, every rational function of the hyperbolic functions and their inverses can be integrated by the help of corresponding known integrals of circular functions. Thus, to find  $\int \operatorname{sech} u \, du$  from

$$\int \sec u \, du = \frac{1}{2} \log \frac{1 + \sin u}{1 - \sin u} = \log \frac{1 + \tan \frac{u}{2}}{1 - \tan \frac{u}{2}},$$

substitute  $iu$  for  $u$  and reduce to the form

$$\int \operatorname{sech} u \, du = \frac{1}{i} \log \frac{1 + i \tanh \frac{u}{2}}{1 - i \tanh \frac{u}{2}}.$$

If in this equation  $\tanh \frac{u}{2}$  is replaced by  $y$ , the second member coincides in form with the expression for  $2 \tan^{-1} y$  given below.

Hence

$$\int \operatorname{sech} u \, du = 2 \tan^{-1}(\tanh \frac{u}{2}) = g' u.$$

Similarly, when a differential is encountered the integral of which is not to be found in this collection, it is expedient to deduce the corresponding expression in cyclic functions by substitution of  $ix$  for  $x$ , etc., and then to make a search for its integral.

Most interesting is the relation existing between the formulæ of spherical trigonometry and the formulæ of Lobachevsky's imaginary geometry, hyperbolic geometry, or pseudo-spherical geometry, as it is sometimes called. Lobachevsky defines the angle  $CPA$  as the angle of parallelism, the line  $PC$  being the limiting position of  $PB$  when the distance  $AB$  is infinite. In this geometry two parallels,  $PC$

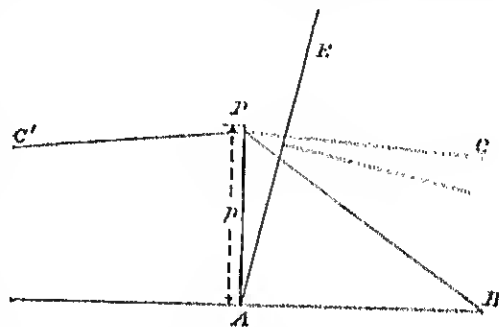


FIG. 2.

and  $PC'$ , may be drawn from a point  $P$  to a line  $AB$ ; the sum of the angles of a triangle is less than two right angles, and the angle of parallelism  $\Pi(p)$  is dependent upon the perpendicular distance  $p$  of the point  $P$  from the line  $AB$ . If now any line passing through  $A$ , such as  $AE$ , is extended until the perpendicular erected at its middle point is parallel to  $AB$ , the locus of the points  $E$  is a boundary curve, and the revolution of this curve about  $AB$  or one of its parallels develops a boundary surface. It is upon this surface of constant negative curvature that Lobachevsky imagines a triangle of sides  $a, b, c$  and angles  $A, B, C$  to be drawn. He establishes as fundamental relations between the sides and angles of this triangle<sup>1</sup>

$$\begin{aligned}\sin A \tan \Pi(a) &= \sin B \tan \Pi(b) = \sin C \tan \Pi(c), \\ \sin \Pi(b) \sin \Pi(c) &= \sin \Pi(a) - \cos \Pi(b) \cos \Pi(c) \sin \Pi(a) \cos A, \\ \sin \Pi(a) \cos A &= -\cos B \cos C \sin \Pi(a) + \sin B \sin C,\end{aligned}$$

and also proves that

$$\begin{aligned}\sin \Pi(u) &= (\cos iu)^{-1} = (\cosh u)^{-1}, \\ \tan \Pi(u) &= i (\sin iu)^{-1} = (\sinh u)^{-1}, \\ \cos \Pi(u) &= -i \tan iu = \tanh u.\end{aligned}$$

Hence the preceding equations may be written

$$\begin{aligned}\frac{\sin A}{\sin b} &= \frac{\sin B}{\sinh b} = \frac{\sin C}{\sinh c}, \\ \cosh a &= \cosh b \cosh c - \sinh b \sinh c \cos A, \\ \cos A &= -\cos B \cos C + \sin B \sin C \cosh a.\end{aligned}$$

These formulas are, in fact, precisely those of spherical trigonometry, in which the real sides  $a, b, c$  have been replaced by the imaginaries  $ia, ib, ic$ . If the triangle on the boundary surface is infinitesimal, the above equations reduce to the well-known relations between the sides and angles of a triangle on the Euclidean plane. The theorems of non-Euclidean geometry may not therefore be inconsistent with experience, for the largest triangle which we can measure is infinitesimal in comparison with a triangle on the boundary surface. Lobachevsky pointed out that a triangle on a boundary surface would correspond to a triangle connecting three stars in distant parts of the universe, and that the postulates of his geometry, involving as they do the question of the curvature of space, would be capable of experimental proof if the parallaxes of distant stars could be measured with sufficient accuracy.

Lastly, there is an important relation between the numerical values of the circular and hyperbolic functions. If the argument  $u$  assumes successive values between 0 and  $+\infty$ ,  $\sinh u$  assumes successive values between 0 and  $+\infty$  just as  $\tan a$  does when  $a$  varies from 0 to  $90^\circ$ ;  $\cosh u$  assumes values between 1 and  $+\infty$  like  $\sec \beta$ , and  $\tanh u$  assumes values between 0 and 1

<sup>1</sup>H. P. Manning's *Non-Euclidean Geometry*, p. 60.



in the same way as  $\sin \gamma$ . The variation of the hyperbolic functions throughout the entire plane and their similarity to the circular functions between the

limits  $0^\circ$  and  $180^\circ$  is shown in the diagram. Since each of the functions is singly periodic, there must be a single value of  $\alpha, \beta, \gamma$  corresponding to a particular value of  $u$ , such that

$$\begin{aligned}\sinh u &= \tan \alpha, \\ \cosh u &= \sec \beta, \\ \tanh u &= \sin \gamma.\end{aligned}$$

It will be found by substituting in the trigonometric formulae that  $\alpha = \beta = \gamma = \phi$ , and the required relations are therefore

$$\begin{aligned}\cosh u &= \sec \phi, \\ \sinh u &= \tan \phi, \\ \tanh u &= \sin \phi.\end{aligned}$$

The angle  $\phi$  which renders it possible to evaluate the hyperbolic functions by means of the circular functions is of great importance in pure and applied mathematics. Some of its properties and applications will be considered in the section on geometrical illustrations. It is called *germanian*  $u$  and is written

$$\phi = gd\ u.$$

The following list of formulae involving the hyperbolic functions might be greatly extended, but it includes the most useful relations.<sup>1</sup>

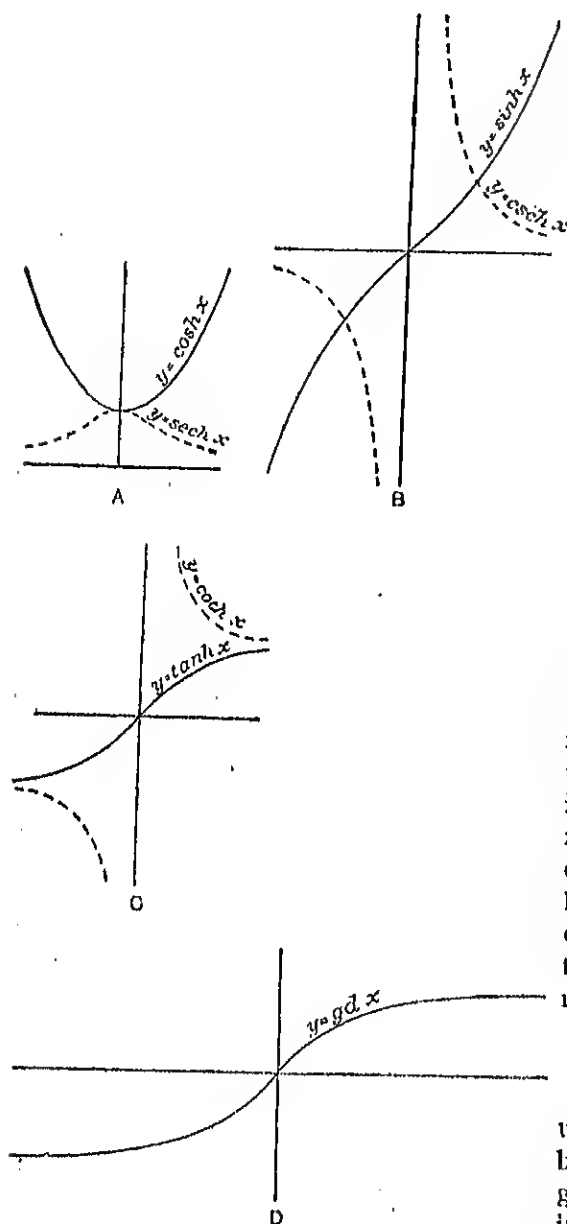


FIG. 3.

<sup>1</sup>Taken with additions from Prof. B. O. Peirce's Short Table of Integrals, and Prof. McMahon's Hyperbolic Functions.

## A.—RELATIONS BETWEEN HYPERBOLIC AND CIRCULAR FUNCTIONS.

1.  $\sinh u = -i \sin iu = \tan gd u,$
2.  $\cosh u = \cos iu = \sec gd u,$
3.  $\tanh u = -i \tan iu = \sin gd u,$
4.  $\tanh \frac{1}{2} u = \tan \frac{1}{2} gd u,$
5.  $e^u = (1 + \sin gd u) \div \cos gd u,$   
 $= [1 - \cos (\frac{1}{2} \pi + gd u)] \div \sin (\frac{1}{2} \pi + gd u),$   
 $= \tan (\frac{1}{2} \pi + \frac{1}{2} gd u),$
6.  $\sinh iu = i \sin u,$
7.  $\cosh iu = \cos u,$
8.  $\tanh iu = i \tan u,$
9.  $\sinh (u \pm iv) = \pm i \sin (v \mp iu),$   
 $= \sinh u \cos v \pm i \cosh u \sin v,$
10.  $\cosh (u \pm iv) = \cos (v \mp iu),$   
 $= \cosh u \cos v \pm i \sinh u \sin v,$
11.  $\cosh (m i \pi) = \cos m \pi. \quad (m \text{ is an integer.})$
12.  $\sinh (2m + 1) \frac{1}{2} i \pi = i \sin (2m + 1) \frac{1}{2} \pi. \quad (m \text{ is an integer.})$

## B.—RELATIONS AMONG THE HYPERBOLIC FUNCTIONS.

13.  $\sinh u = \frac{1}{2} (e^u - e^{-u}) = -\sinh (-u) = (\operatorname{csch} u)^{-1}$   
 $= 2 \tanh \frac{1}{2} u \div (1 - \tanh^2 \frac{1}{2} u) = \tanh u \div (1 - \tanh^2 u)^{\frac{1}{2}},$
14.  $\cosh u = \frac{1}{2} (e^u + e^{-u}) = \cosh (-u) = (\operatorname{sech} u)^{-1},$   
 $= (1 + \tanh^2 \frac{1}{2} u) \div (1 - \tanh^2 \frac{1}{2} u) = 1 \div (1 - \tanh^2 u)^{\frac{1}{2}},$
15.  $\tanh u = (e^u - e^{-u}) \div (e^u + e^{-u}) = -\tanh (-u),$   
 $= (\coth u)^{-1} = \sinh u \div \cosh u = (1 - \operatorname{sech}^2 u)^{\frac{1}{2}},$
16.  $\operatorname{sech} u = \operatorname{sech} (-u) = (1 - \tanh^2 u)^{\frac{1}{2}},$
17.  $\operatorname{csch} u = -\operatorname{csch} (-u) = (\coth^2 u - 1)^{\frac{1}{2}},$
18.  $\coth u = -\coth (-u) = (\operatorname{csch}^2 u + 1)^{\frac{1}{2}},$
19.  $\cosh^2 u - \sinh^2 u = 1,$
20.  $\sinh \frac{1}{2} u = \sqrt{\frac{1}{2} (\cosh u - 1)},$
21.  $\cosh \frac{1}{2} u = \sqrt{\frac{1}{2} (\cosh u + 1)},$
22.  $\tanh \frac{1}{2} u = (\cosh u - 1) \div \sinh u,$   
 $= \sinh u \div (1 + \cosh u) = \sqrt{(\cosh u - 1) \div (\cosh u + 1)},$
23.  $\sinh 2u = 2 \sinh u \cosh u = 2 \tanh u \div (1 - \tanh^2 u),$
24.  $\cosh 2u = \cosh^2 u + \sinh^2 u = 2 \cosh^2 u - 1,$   
 $= 1 + 2 \sinh^2 u = (1 + \tanh^2 u) \div (1 - \tanh^2 u),$
25.  $\tanh 2u = 2 \tanh u \div (1 + \tanh^2 u),$
26.  $\sinh 3u = 3 \sinh u + 4 \sinh^3 u,$
27.  $\cosh 3u = 4 \cosh^3 u - 3 \cosh u,$
28.  $\tanh 3u = (3 \tanh u + \tanh^3 u) \div (1 + 3 \tanh^2 u),$

29.  $\sinh nu =$   

$$n \cosh^{n-1} u \sinh u + \frac{n(n-1)(n-2)}{6} \cosh^{n-3} u \sinh^3 u + \dots$$
30.  $\cosh nu = \cosh^n u + \frac{n(n-1)}{2} \cosh^{n-2} u \sinh^2 u + \dots$
31.  $\sinh u + \sinh v = 2 \sinh \frac{1}{2}(u+v) \cosh \frac{1}{2}(u-v),$
32.  $\sinh u - \sinh v = 2 \cosh \frac{1}{2}(u+v) \sinh \frac{1}{2}(u-v),$
33.  $\cosh u + \cosh v = 2 \cosh \frac{1}{2}(u+v) \cosh \frac{1}{2}(u-v),$
34.  $\cosh u - \cosh v = 2 \sinh \frac{1}{2}(u+v) \sinh \frac{1}{2}(u-v),$
35.  $\sinh u + \cosh u = (1 + \tanh \frac{1}{2} u) : (1 - \tanh \frac{1}{2} u),$
36.  $(\sinh u + \cosh u)^n = \cosh nu + \sinh nu,$
37.  $\tanh u + \tanh v = \sinh(u+v) : \cosh u \cosh v,$
38.  $\tanh u - \tanh v = \sinh(u-v) : \cosh u \cosh v,$
39.  $\coth u + \coth v = \sinh(u+v) : \sinh u \sinh v,$
40.  $\coth u - \coth v = -\sinh(u-v) : \sinh u \sinh v,$
41.  $\sinh(u \pm v) = \sinh u \cosh v \pm \cosh u \sinh v,$
42.  $\cosh(u \pm v) = \cosh u \cosh v \pm \sinh u \sinh v,$
43.  $\tanh(u \pm v) = (\tanh u \pm \tanh v) : (1 \pm \tanh u \tanh v),$
44.  $\coth(u \pm v) = (\coth u \coth v \pm 1) : (\coth v \pm \coth u),$
45.  $\sinh(u+v) + \sinh(u-v) = 2 \sinh u \cosh v,$
46.  $\sinh(u+v) - \sinh(u-v) = 2 \cosh u \sinh v,$
47.  $\cosh(u+v) + \cosh(u-v) = 2 \cosh u \cosh v,$
48.  $\cosh(u+v) - \cosh(u-v) = 2 \sinh u \sinh v,$
49.  $\tanh \frac{1}{2}(u+v) = (\sinh u + \sinh v) : (\cosh u + \cosh v),$
50.  $\tanh \frac{1}{2}(u-v) = (\sinh u - \sinh v) : (\cosh u + \cosh v),$
51.  $\coth \frac{1}{2}(u+v) = (\sinh u - \sinh v) : (\cosh u - \cosh v),$
52.  $\coth \frac{1}{2}(u-v) = (\sinh u + \sinh v) : (\cosh u - \cosh v),$
53.  $\frac{\tanh u + \tanh v}{\tanh u - \tanh v} = \frac{\sinh(u+v)}{\sinh(u-v)},$
54.  $\frac{\coth u + \coth v}{\coth u - \coth v} = \frac{\sinh(u+v)}{\sinh(u-v)},$
55.  $\sinh(u+v) + \cosh(u+v) = (\cosh u + \sinh u)(\cosh v + \sinh v),$
56.  $\sinh(u+v) \sinh(u-v) = \sinh^2 u - \sinh^2 v,$   
 $= \cosh^2 u - \cosh^2 v,$
57.  $\cosh(u+v) \cosh(u-v) = \cosh^2 u + \sinh^2 v,$   
 $= \sinh^2 u + \cosh^2 v,$
58.  $\sinh(mi\pi) = 0, \quad (m \text{ is an integer}).$
59.  $\cosh(mi\pi) = (-1)^m,$
60.  $\tanh(mi\pi) = 0,$
61.  $\sinh(u + mi\pi) = (-1)^m \sinh u,$
62.  $\cosh(u + mi\pi) = (-1)^m \cosh u,$
63.  $\sinh(2m+1)\frac{1}{2}i\pi = \pm i,$

$$64. \cosh (2m + 1) \frac{1}{2} i \pi = 0.$$

$$65. \sinh \left( \frac{i\pi}{2} \pm u \right) = i \cosh u.$$

$$66. \cosh \left( \frac{i\pi}{2} \pm u \right) = \pm i \sinh u.$$

$$67. \tanh (u + i\pi) = \tanh u.$$

## C.—INVERSE HYPERBOLIC FUNCTIONS.

$$68. \sinh^{-1} u = \log (u + \sqrt{u^2 + 1}) = \cosh^{-1} \sqrt{u^2 + 1} = \int \frac{du}{(u^2 + 1)^{3/2}}.$$

$$69. \cosh^{-1} u = \log (u + \sqrt{u^2 - 1}) = \sinh^{-1} \sqrt{u^2 - 1} = \int \frac{du}{(u^2 - 1)^{3/2}}.$$

$$70. \tanh^{-1} u = \frac{1}{2} \log (1 + u) - \frac{1}{2} \log (1 - u) = \int \frac{du}{1 - u^2}.$$

$$71. \coth^{-1} u = \frac{1}{2} \log (1 + u) - \frac{1}{2} \log (u - 1) = \int \frac{du}{1 - u^2} = \tanh^{-1} \frac{1}{u}.$$

$$72. \operatorname{sech}^{-1} u = \log \left( \frac{1}{u} + \sqrt{\frac{1}{u^2} - 1} \right) = - \int \frac{du}{u(1 - u^2)^{3/2}} = \cosh^{-1} \frac{1}{u}.$$

$$73. \operatorname{csch}^{-1} u = \log \left( \frac{1}{u} + \sqrt{\frac{1}{u^2} + 1} \right) = - \int \frac{du}{u(u^2 + 1)^{3/2}} = \sinh^{-1} \frac{1}{u}.$$

$$74. \sin^{-1} u = -i \sinh^{-1} iu = -i \log (iu + \sqrt{1 - u^2}).$$

$$75. \cos^{-1} u = -i \cosh^{-1} u = -i \log (u + i \sqrt{1 - u^2}).$$

$$76. \tan^{-1} u = -i \tanh^{-1} iu = \frac{1}{2i} \log (1 + iu) - \frac{1}{2i} \log (1 - iu).$$

$$77. \cot^{-1} u = i \coth^{-1} iu = \frac{1}{2i} \log (iu - 1) - \frac{1}{2i} \log (iu + 1).$$

$$78. \sin^{-1} iu = i \sinh^{-1} u = i \log (u + \sqrt{1 + u^2}).$$

$$79. \cos^{-1} iu = -i \cosh^{-1} iu = \frac{\pi}{2} - i \log (u + \sqrt{1 + u^2}).$$

$$80. \tan^{-1} iu = i \tanh^{-1} u = \frac{i}{2} \log (1 + u) - \frac{i}{2} \log (1 - u).$$

$$81. \cot^{-1} iu = -i \coth^{-1} u = -\frac{i}{2} \log (u + 1) + \frac{i}{2} \log (u - 1).$$

$$82. \cosh^{-1} \frac{1}{2} \left( u + \frac{1}{u} \right) = \sinh^{-1} \frac{1}{2} \left( u - \frac{1}{u} \right) = \tanh^{-1} \frac{u^2 - 1}{u^2 + 1},$$

$$= 2 \tanh^{-1} \frac{u - 1}{u + 1} = \log u.$$

$$83. \tanh^{-1} \tanh u = \frac{1}{2} g d^{-1} 2 u.$$

$$84. \tan^{-1} \tanh u = \frac{1}{2} g d^{-1} 2 u.$$

$$85. \cosh^{-1} \csc 2u = -\sinh^{-1} \cot 2u = -\tanh^{-1} \cos 2u = \log \tan u.$$

$$86. \tanh^{-1} \tan^2 \left( \frac{1}{2} \pi + \frac{1}{2} u \right) = \frac{1}{2} \log \csc u.$$

$$87. \tanh^{-1} \tan^2 \frac{1}{2} u = \frac{1}{2} \log \sec u.$$

$$88. \cosh^{-1} u \pm \cosh^{-1} v = \cosh^{-1} [uv \pm 1 \sqrt{(u^2 - 1)(v^2 - 1)}],$$

$$89. \sinh^{-1} u \pm \sinh^{-1} v = \sinh^{-1} [u \sqrt{1 + v^2} \pm v \sqrt{1 + u^2}].$$

## D.—SERIES.

$$90. e^u = 1 + u + \frac{u^2}{2!} + \frac{u^3}{3!} + \frac{u^4}{4!} + \dots \quad (u^1 < \infty)$$

$$91. \log u = (u-1) - \frac{1}{2}(u-1)^2 + \frac{1}{3}(u-1)^3 - \dots \quad (2 > u > 0)$$

$$92. \log u = \frac{u-1}{u} + \frac{1}{2} \left( \frac{u-1}{u} \right)^2 + \frac{1}{3} \left( \frac{u-1}{u} \right)^3 + \dots \quad (u > 1)$$

$$93. \log u = 2 \left[ \frac{u-1}{u+1} + \frac{1}{3} \left( \frac{u-1}{u+1} \right)^3 + \frac{1}{5} \left( \frac{u-1}{u+1} \right)^5 + \dots \right] \quad (u > 0)$$

$$94. \log (1+u) = u - \frac{1}{2} u^2 + \frac{1}{3} u^3 - \frac{1}{4} u^4 + \dots \quad (u^1 < 1)$$

$$95. \log \left( \frac{1+u}{1-u} \right) = 2 \left[ u + \frac{1}{3} u^3 + \frac{1}{5} u^5 + \frac{1}{7} u^7 + \dots \right] \quad (u^1 < 1)$$

$$96. \log \left( \frac{u+1}{u-1} \right) = 2 \left[ \frac{1}{u} + \frac{1}{3} \left( \frac{1}{u} \right)^3 + \frac{1}{5} \left( \frac{1}{u} \right)^5 + \dots \right] \quad (u^1 > 1)$$

$$97. \sinh u = u + \frac{u^3}{3!} + \frac{u^5}{5!} + \frac{u^7}{7!} + \dots \quad (u^1 < \infty)$$

$$= u \left( 1 + \frac{u^2}{\pi^2} \right) \left( 1 + \frac{u^2}{2^2 \pi^2} \right) \left( 1 + \frac{u^2}{3^2 \pi^2} \right) \dots \quad (u^1 < \infty)$$

$$98. \cosh u = 1 + \frac{u^2}{2!} + \frac{u^4}{4!} + \frac{u^6}{6!} + \dots \quad (u^1 < \infty)$$

$$= \left( 1 + \frac{4u^2}{\pi^2} \right) \left( 1 + \frac{4u^2}{3^2 \pi^2} \right) \left( 1 + \frac{4u^2}{5^2 \pi^2} \right) \dots \quad (u^1 < \infty)$$

$$99. \tanh u = u - \frac{1}{3} u^3 + \frac{2}{15} u^5 - \frac{17}{315} u^7 + \dots \quad (u^1 < \frac{1}{2} \pi^1)$$

$$100. u \coth u = 1 + \frac{1}{3} u^2 - \frac{1}{45} u^4 + \frac{2}{945} u^6 - \dots \quad (u^1 < \pi^1)$$

$$101. \operatorname{sech} u = 1 - \frac{1}{2} u^2 + \frac{5}{24} u^4 - \frac{61}{720} u^6 + \dots \quad (u^1 < \frac{1}{2} \pi^1)$$

$$102. u \operatorname{csch} u = 1 - \frac{1}{6} u^2 + \frac{7}{360} u^4 - \frac{31}{15120} u^6 + \dots \quad (u^1 < \pi^1)$$

$$103. gd u = \phi = u - \frac{1}{6} u^3 + \frac{1}{24} u^5 - \frac{61}{5040} u^7 + \dots \quad (u \text{ small})$$

$$= \frac{\pi}{2} - \operatorname{sech} u - \frac{1}{2} \frac{\operatorname{sech}^3 u}{3} - \frac{1}{2} \frac{3}{4} \frac{\operatorname{sech}^5 u}{5} - \dots \quad (u \text{ large})$$

$$104. u = g d^{-1} \phi = \phi + \frac{1}{6} \phi^3 + \frac{1}{24} \phi^5 + \frac{61}{5040} \phi^7 + \dots \quad \left( \phi < \frac{\pi}{2} \right)$$

$$105. \sinh^{-1} u = u - \frac{1}{2} \frac{u^3}{3} + \frac{1}{2} \frac{3}{4} \frac{u^5}{5} - \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{u^7}{7} + \dots \quad (u^2 < 1.)$$

$$= \log 2u + \frac{1}{2} \frac{1}{2u^2} - \frac{1}{2} \frac{3}{4} \frac{1}{4u^4} + \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{1}{6u^6} - \dots \quad (u^2 > 1.)$$

$$106. \cosh^{-1} u = \log 2u - \frac{1}{2} \frac{1}{2u^2} - \frac{1}{2} \frac{3}{4} \frac{1}{4u^4} - \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{1}{6u^6} - \dots \quad (u^2 > 1.)$$

$$107. \tanh^{-1} u = u + \frac{1}{3} u^3 + \frac{1}{5} u^5 + \frac{1}{7} u^7 + \dots \quad (u^2 < 1.)$$

$$108. \coth^{-1} u = \tanh^{-1} \frac{1}{u} = \frac{1}{u} + \frac{1}{3u^3} + \frac{1}{5u^5} + \frac{1}{7u^7} + \dots \quad (u^2 > 1.)$$

$$109. \operatorname{sech}^{-1} u = \cosh^{-1} \frac{1}{u} = \log \frac{2}{u} - \frac{1}{2} \frac{u^2}{2} - \frac{1}{2} \frac{3}{4} \frac{u^4}{4} - \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{u^6}{6} - \dots \quad (u^2 < 1.)$$

$$110. \operatorname{csch}^{-1} u = \sinh^{-1} \frac{1}{u} = \frac{1}{u} - \frac{1}{2} \frac{1}{3u^3} + \frac{1}{2} \frac{3}{4} \frac{1}{5u^5} - \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{1}{7u^7} + \dots \quad (u^2 > 1.)$$

$$= \log \frac{2}{u} + \frac{1}{2} \frac{u^2}{2} - \frac{1}{2} \frac{3}{4} \frac{u^4}{4} + \frac{1}{2} \frac{3}{4} \frac{5}{6} \frac{u^6}{6} - \dots \quad (u^2 < 1.)$$

## E.—DERIVATIVES.

$$111. \frac{d e^u}{du} = e^u.$$

$$112. d \frac{\log_e u}{du} = \frac{1}{u}.$$

$$113. \frac{d a^u}{du} = a^u \cdot \frac{dv}{du} \cdot \log_e a.$$

$$114. \frac{d u^u}{du} = u^u (1 + \log_e u).$$

$$115. \frac{d \sinh u}{du} = \cosh u.$$

$$116. \frac{d \cosh u}{du} = \sinh u.$$

$$117. \frac{d \tanh u}{du} = \operatorname{sech}^2 u.$$

$$118. \frac{d \coth u}{du} = -\operatorname{csch}^2 u.$$

$$119. \frac{d \operatorname{sech} u}{du} = -\operatorname{sech} u \cdot \tanh u.$$

$$120. \frac{d \operatorname{csch} u}{du} = -\operatorname{csch} u \cdot \coth u.$$

$$121. \frac{d \sinh^{-1} u}{du} = \frac{1}{\sqrt{u^2 + 1}}.$$

$$122. \frac{d \cosh^{-1} u}{du} = \frac{1}{\sqrt{u^2 - 1}}.$$

$$123. \frac{d \tanh^{-1} u}{du} = \frac{1}{1 - u^2}.$$

$$124. \frac{d \coth^{-1} u}{du} = \frac{1}{1 - u^2}.$$

$$125. \frac{d \operatorname{sech}^{-1} u}{du} = \frac{-1}{u \sqrt{1 - u^2}}.$$

$$126. \frac{d \operatorname{csch}^{-1} u}{du} = \frac{-1}{u \sqrt{u^2 + 1}}.$$

$$127. \frac{d \operatorname{gd} u}{du} = \operatorname{sech} u.$$

$$128. \frac{d \operatorname{gd}^{-1} u}{du} = \sec u.$$

F.—INTEGRALS. (INTEGRATION CONSTANTS ARE OMITTED.)

$$129. \int \sinh u \, du = \cosh u.$$

$$130. \int \cosh u \, du = \sinh u.$$

$$131. \int \tanh u \, du = \log \cosh u.$$

$$132. \int \coth u \, du = \log \sinh u.$$

$$133. \int \operatorname{sech} u \, du = 2 \tan^{-1} e^u = \operatorname{gd} u.$$

$$134. \int \operatorname{csch} u \, du = \log \tanh \frac{u}{2}.$$

$$135. \int \sinh^n u \, du = \frac{1}{n} \sinh^{n-1} u \cosh u - \frac{n-1}{n} \int \sinh^{n-2} u \, du, \\ = \frac{1}{n+1} \sinh^{n+1} u \cosh u - \frac{n+2}{n+1} \int \sinh^{n+2} u \, du.$$

$$136. \int \cosh^n u \, du = \frac{1}{n} \sinh u \cosh^{n-1} u + \frac{n-1}{n} \int \cosh^{n-2} u \, du, \\ = -\frac{1}{n+1} \sinh u \cosh^{n+1} u + \frac{n+2}{n+1} \int \cosh^{n+2} u \, du.$$

$$137. \int u \sinh u \, du = u \cosh u - \sinh u.$$

$$138. \int u \cosh u \, du = u \sinh u - \cosh u.$$

$$139. \int u^2 \sinh u \, du = (u^2 + 2) \cosh u - 2u \sinh u.$$

$$140. \int u^n \sinh u \, du = u^n \cosh u - nu^{n-1} \sinh u \\ + n(n-1) \int u^{n-2} \sinh u \, du.$$

$$141. \int \sinh^2 u \, du = \frac{1}{2} (\sinh u \cosh u - u).$$

$$142. \int \sinh u, \cosh u \, du = \frac{1}{2} \cosh (2u).$$

$$143. \int \cosh^2 u \, du = \frac{1}{2} (\sinh u \cosh u + u).$$

$$144. \int \tanh^2 u \, du = u - \tanh u.$$

$$145. \int \coth^2 u \, du = u - \coth u.$$

$$146. \int \operatorname{sech}^2 u \, du = \tanh u.$$

$$147. \int \operatorname{sech}^3 u \, du = \frac{1}{2} \operatorname{sech} u \tanh u + \frac{1}{2} \operatorname{gd} u.$$

$$148. \int \operatorname{csch}^2 u \, du = -\coth u.$$

$$149. \int \sinh^{-1} u \, du = u \sinh^{-1} u - (1 + u^2)^{1/2}.$$

$$150. \int \cosh^{-1} u \, du = u \cosh^{-1} u - (u^2 - 1)^{1/2}.$$

$$151. \int \tanh^{-1} u \, du = u \tanh^{-1} u + \frac{1}{2} \log (1 - u^2).$$

$$152. \int u \sinh^{-1} u \, du = \frac{1}{2} \left[ (2u^2 + 1) \sinh^{-1} u - u (1 + u^2)^{1/2} \right].$$

$$153. \int u \cosh^{-1} u \, du = \frac{1}{2} \left[ (2u^2 - 1) \cosh^{-1} u - u (u^2 - 1)^{1/2} \right].$$

$$154. \int (\cosh a + \cosh u)^{-1} \, du = 2 \operatorname{csch} a, \tanh^{-1} (\tanh \frac{1}{2} u, \tanh \frac{1}{2} a), \\ = \operatorname{csch} a \left[ \log \cosh \frac{1}{2} (u + a) - \log \cosh \frac{1}{2} (u - a) \right].$$

$$155. \int (\cos a + \cosh u)^{-1} \, du = 2 \operatorname{csc} a, \tan^{-1} (\tanh \frac{1}{2} u, \tan \frac{1}{2} a).$$

$$156. \int (1 + \cos a, \cosh u)^{-1} \, du = 2 \operatorname{csc} a, \tanh^{-1} (\tanh \frac{1}{2} u, \tan \frac{1}{2} a).$$

$$157. \int \sinh u \cos u \, du = \frac{1}{2} (\cosh u, \cos u + \sinh u, \sin u).$$

$$158. \int \cosh u, \cos u \, du = \frac{1}{2} (\sinh u, \cos u + \cosh u, \sin u).$$

$$159. \int \sinh u, \sin u \, du = \frac{1}{2} (\cosh u, \sin u - \sinh u, \cos u).$$

$$160. \int \cosh u, \sin u \, du = \frac{1}{2} (\sinh u, \sin u - \cosh u, \cos u).$$

$$161. \int \sinh (mu) \sinh (nu) \, du \\ = \frac{1}{m^2 - n^2} \left[ m \sinh (nu) \cosh (mu) - n \cosh (nu) \sinh (mu) \right].$$





$$\begin{aligned}
 176. \quad & \int \frac{du}{(a-u)(u-b)^{\frac{1}{2}}(a-b)^{\frac{1}{2}}} \tanh^{-1} \sqrt{\frac{u-b}{a-b}}, \\
 & \text{or } \frac{-2}{(b-a)^{\frac{1}{2}}} \tan^{-1} \sqrt{\frac{u-b}{b-a}}, \\
 & \text{or } \frac{2}{(a-b)^{\frac{1}{2}}} \coth^{-1} \sqrt{\frac{u-b}{a-b}}. \quad (\text{The real form is to be taken.})
 \end{aligned}$$

$$\begin{aligned}
 177. \quad & \int \frac{du}{(a-u)(b-u)^{\frac{1}{2}}(b-a)^{\frac{1}{2}}} \tanh^{-1} \sqrt{\frac{b-u}{b-a}}, \\
 & \text{or } \frac{2}{(b-a)^{\frac{1}{2}}} \coth^{-1} \sqrt{\frac{b-u}{b-a}}, \\
 & \text{or } \frac{-2}{(a-b)^{\frac{1}{2}}} \tan^{-1} \sqrt{\frac{b-u}{a-b}}. \quad (\text{The real form is to be taken.})
 \end{aligned}$$

$$178. \quad \int (u^2 - a^2)^{\frac{1}{2}} du = \frac{1}{2} u (u^2 - a^2)^{\frac{1}{2}} - \frac{1}{2} a^2 \cosh^{-1} \frac{u}{a}.$$

$$179. \quad \int (a^2 - u^2)^{\frac{1}{2}} du = \frac{1}{2} u (a^2 - u^2)^{\frac{1}{2}} + \frac{1}{2} a^2 \sin^{-1} \frac{u}{a}.$$

$$180. \quad \int (u^2 + a^2)^{\frac{1}{2}} du = \frac{1}{2} u (u^2 + a^2)^{\frac{1}{2}} + \frac{1}{2} a^2 \sinh^{-1} \frac{u}{a}.$$

$$181. \quad \int e^{au} du = \frac{e^{au}}{a}.$$

$$182. \quad \int u e^{au} du = \frac{e^{au}}{a^2} (au - 1).$$

$$183. \quad \int u^m e^{au} du = \frac{u^m e^{au}}{a} - \frac{m}{a} \int u^{m-1} e^{au} du.$$

$$184. \quad \int \frac{e^{au}}{u^n} du = \frac{1}{n-1} \left[ -\frac{e^{au}}{u^{n-1}} + a \int \frac{e^{au}}{u^{n-1}} du \right].$$

$$185. \quad \int a^{bu} du = \frac{a^{bu}}{b \log a}.$$

$$\begin{aligned}
 186. \quad & \int u^n a^u du = \frac{a^u u^n}{\log a} - \frac{na^u u^{n-1}}{(\log a)^2} + \frac{n(n-1)a^u u^{n-2}}{(\log a)^3} \dots \\
 & \dots + \frac{n(n-1)(n-2) \dots 2 \cdot 1 a^u}{(\log a)^{n+1}}.
 \end{aligned}$$

$$\begin{aligned}
 187. \quad & \int \frac{a^u}{u^n} du = \frac{a^u}{n-1} \left[ -\frac{1}{u^{n-1}} - \frac{\log a}{(n-2)u^{n-2}} - \frac{(\log a)^2}{(n-2)(n-3)u^{n-3}} \right. \\
 & \left. \dots + \frac{(\log a)^{n-1}}{(n-2)(n-3) \dots 2 \cdot 1} \int \frac{a^u}{u} du \right].
 \end{aligned}$$

$$188. \quad \int \frac{a^u}{u} du = \log u + u \log a + \frac{(u \log a)^2}{2 \cdot 2!} + \frac{(u \log a)^3}{3 \cdot 3!} + \dots$$

$$189. \int \frac{du}{1+e^u} = \log \frac{e^u}{1+e^u}.$$

$$190. \int \frac{du}{a+be^{mu}} = \frac{1}{am} \left[ mu - \log(a+be^{mu}) \right].$$

$$191. \int \frac{du}{ae^{mu}+be^{-mu}} = \frac{1}{m(ab)^{1/2}} \tan^{-1} \left( e^{mu} \sqrt{\frac{a}{b}} \right).$$

$$192. \int \frac{du}{(a+be^{mu})^{1/2}} = \frac{1}{m\sqrt{a}} \left[ \log(\sqrt{a+be^{mu}} + \sqrt{a}) \right. \\ \left. - \log(\sqrt{a+be^{mu}} + \sqrt{a}) \right].$$

$$193. \int \frac{ue^u du}{(1+u)^2} = \frac{e^u}{1+u}.$$

$$194. \int e^{au} \log u du = \frac{e^{au} \log u}{a} - \frac{1}{a} \int \frac{e^{au} du}{u}.$$

$$195. \int \log u du = u \log u - u.$$

$$196. \int u^m \log u du = u^{m+1} \left[ \frac{\log u}{m+1} - \frac{1}{(m+1)^2} \right].$$

$$197. \int (\log u)^n du = u (\log u)^n - n \int (\log u)^{n-1} du.$$

$$198. \int u^m (\log u)^n du = \frac{u^{m+1} (\log u)^n}{m+1} - \frac{n}{m+1} \int u^m (\log u)^{n-1} du.$$

$$199. \int \frac{(\log u)^n du}{u} = \frac{(\log u)^{n+1}}{n+1}.$$

$$200. \int \frac{du}{\log u} = \log(\log u) + \log u + \frac{(\log u)^2}{2 \cdot 2!} + \frac{(\log u)^3}{3 \cdot 3!} + \dots$$

$$201. \int \frac{du}{(\log u)^n} = -\frac{u}{(n-1)(\log u)^{n-1}} + \frac{1}{n-1} \int \frac{du}{(\log u)^{n-1}}.$$

$$202. \int \frac{u^m du}{(\log u)^n} = -\frac{u^{m+1}}{(n-1)(\log u)^{n-1}} + \frac{m+1}{n-1} \int \frac{u^m du}{(\log u)^{n-1}}.$$

$$203. \int \frac{u^m du}{\log u} = \int \frac{e^{y \log u}}{y} dy, \text{ where } y = (m+1) \log u.$$

$$204. \int \frac{du}{u \log u} = \log(\log u).$$

$$205. \int \frac{du}{u (\log u)^n} = -\frac{1}{(n-1)(\log u)^{n-1}}.$$

$$206. \int (a+bu)^m \log u du = \\ \frac{1}{b(m+1)} \left[ (a+bu)^{m+1} \log u - \int \frac{(a+bu)^{m+1} du}{u} \right].$$

$$207. \int u^m \log (a + bu) du =$$

$$= \frac{1}{m+1} \left[ u^{m+1} \log (a + bu) - b \int \frac{u^{m+1} du}{a + bu} \right].$$

$$208. \int \frac{\log (a + bu) du}{u} =$$

$$\log a + \log u + \frac{bu}{a} - \frac{1}{2} \left( \frac{bu}{a} \right)^2 + \frac{1}{3} \left( \frac{bu}{a} \right)^3 - \dots \\ - \frac{1}{2} (\log bu)^2 - \frac{a}{bu} + \frac{1}{2} \left( \frac{a}{bu} \right)^2 - \frac{1}{3} \left( \frac{a}{bu} \right)^3 + \dots$$

$$209. \int \frac{\log u du}{(a + bu)^m} = \frac{1}{b(m-1)} \left[ -\frac{\log u}{(a + bu)^{m-1}} + \int \frac{du}{u(a + bu)^{m-1}} \right].$$

$$210. \int \frac{\log u du}{u + bu} = \frac{1}{b} \log u + \log (u + bu) - \frac{1}{b} \int \frac{\log (a + bu)}{u} du.$$

$$211. \int (a + bu) \log u du = \frac{(u + bu)^2}{2b} \log u - \frac{u^2 \log u}{2b} + au - \frac{1}{2} bu^2.$$

$$212. \int \frac{\log u du}{(a + bu)^2} =$$

$$\frac{2}{b} \left[ (\log u - 2) \sqrt{a + bu} + \sqrt{a} \log (\sqrt{a + bu} + \sqrt{a}) \right. \\ \left. - \sqrt{a} \log (\sqrt{a} + \sqrt{bu}) - \sqrt{a} \right], \text{ if } a > 0,$$

$$= \frac{2}{b} \left[ (\log u - 2) \sqrt{a + bu} + 2 \sqrt{-a} \tan^{-1} \sqrt{\frac{a + bu}{-a}} \right], \text{ if } a < 0.$$

$$213. \int_0^a e^{-a^2 u^2} du = \frac{\sqrt{\pi}}{2a} = \frac{1}{2a} \Gamma\left(\frac{1}{2}\right).$$

$$214. \int_0^a u^n e^{-au^2} du = \Gamma\left(\frac{n+1}{2}\right) \frac{1}{a^{\frac{n+1}{2}}} = \frac{n!}{a^{\frac{n+1}{2}}}.$$

$$215. \int_0^{(2n)} u^{2n} e^{-au^2} du = \frac{1 \cdot 3 \cdot 5 \dots (2n-1)}{2^{n+1} a^n} \sqrt{\frac{\pi}{a}}.$$

$$216. \int_0^{(2n)} e^{-u^2} \frac{u^2}{u^2} du = \frac{e^{-u^2}}{2} \sqrt{\frac{\pi}{a}}, \quad a > 0.$$

$$217. \int_0^{(2n)} e^{-u^2} \sqrt{u} du = \frac{1}{2n} \sqrt{\frac{\pi}{n}}.$$

$$218. \int_0^{(2n)} \frac{e^{-u^2}}{\sqrt{u}} du = \sqrt{\frac{\pi}{n}}, \quad n > 0.$$

$$219. \int_0^{(2n)} \frac{du}{\sinh (nu)} = \frac{\pi}{2n}.$$

$$220. \int_0^{(2n)} \frac{u du}{\sinh (nu)} = \frac{\pi^2}{4n^2}.$$

$$221. \int_0^{i\pi} \sinh(mu) \cdot \sinh(nu) du = \int_0^{i\pi} \cosh(mu) \cdot \cosh(nu) du \\ = 0, \text{ if } m \text{ is different from } n.$$

$$222. \int_0^{i\pi} \cosh^2(mu) du = - \int_0^{i\pi} \sinh^2(mu) du = \frac{i\pi}{2}.$$

$$223. \int_{-i\pi}^{+i\pi} \sinh(mu) du = 0.$$

$$224. \int_0^{i\pi} \cosh(mu) du = 0.$$

$$225. \int_{-i\pi}^{i\pi} \sinh(mu) \cosh(nu) du = 0.$$

$$226. \int_0^{i\pi} \sinh(mu) \cosh(mu) du = 0.$$

$$227. \int_0^1 \frac{\log u}{1-u} du = -\frac{\pi^2}{6}.$$

$$228. \int_0^1 \frac{\log u}{1+u} du = -\frac{\pi^2}{12}.$$

$$229. \int_0^1 \frac{\log u}{1-u^2} du = -\frac{\pi^2}{8}.$$

$$230. \int_0^1 \log \left( \frac{1+u}{1-u} \right) \cdot \frac{du}{u} = \frac{\pi^2}{4}.$$

$$231. \int_0^1 \frac{\log u du}{(1-u^2)^{1/2}} = -\frac{\pi}{2} \log 2.$$

$$232. \int_0^1 \frac{(u^p - u^q) du}{\log u} = \log \frac{p+1}{q+1}, \text{ if } p+1 > 0, q+1 > 0.$$

$$233. \int_0^1 (\log u)^n du = (-1)^n \cdot n!.$$

$$234. \int_0^1 \left( \log \frac{1}{u} \right)^{1/2} du = \sqrt{\frac{\pi}{2}}.$$

$$235. \int_0^1 \left( \log \frac{1}{u} \right)^n du = n!.$$

$$236. \int_0^1 \frac{du}{\left( \log \frac{1}{u} \right)^{1/2}} = \sqrt{\pi}.$$

$$237. \int_0^1 u^n \log \left( \frac{1}{u} \right)^n du = \frac{\Gamma(n+1)}{(n+1)^{n+1}}, \text{ if } n+1 > 0, n+1 > 0.$$

$$238. \int_0^{\infty} \log \left( \frac{e^u + 1}{e^u - 1} \right) du = \frac{\pi^2}{4}.$$

## G.—FORMULAS FOR THE SOLUTION OF PSEUDO-SPHERICAL TRIANGLES.

*a.*—*Right Triangles.*

$$\sin A = \frac{\cot H(a)}{\cot H(c)} = \frac{\sinh a}{\sinh c},$$

$$\cos A = \frac{\cos H(b)}{\cos H(c)} = \frac{\tanh b}{\tanh c},$$

$$\cos A = \frac{\sin B}{\sin H(a)} = \sin B \cosh a,$$

$$\cot A = \frac{\cot H(b)}{\cos H(a)} = \frac{\sinh b}{\tanh a},$$

$$\cos B = \frac{\cos H(a)}{\cos H(c)} = \frac{\tanh a}{\tanh c},$$

$$\cos B = \frac{\sin A}{\sin H(b)} = \sin A \cosh b,$$

$$\sin B = \frac{\cot H(b)}{\cot H(c)} = \frac{\sinh b}{\sinh c},$$

$$\cot B = \frac{\cot H(a)}{\cos H(b)} = \frac{\sinh a}{\tanh b},$$

$$\tan A \tan B = \sin H(c) = \sin H(a) \sin H(b),$$

$$\operatorname{sech} c = \operatorname{sech} a \operatorname{sech} b,$$

*b.*—*Oblique Triangles.*

The general relations are:

$$\cosh a = \cosh b \cosh c - \sinh b \sinh c \cos A,$$

$$\sin A \sinh b = \sin B \sinh a,$$

$$\coth a \sinh b = \cosh b \cos C + \sin C \cot A,$$

$$\cos A = -\cos B \cos C + \sin B \sin C \cosh a,$$

Porti solves the six typical cases in the following manner:

CASE 1.—Given  $a, b, c$ . Put  $2\rho = a + b + c$ . Then,

$$\tan \frac{1}{2} A = \sqrt{\frac{\sinh(\rho - b) \sinh(\rho - c)}{\sinh \rho \sinh(\rho - a)}}.$$

The conditions are  $a < b + c$ ,  $b < a + c$ , and  $c < a + b$ .

CASE 2.—Given  $a, b, A$ . Draw the geodesic line  $CD$  perpendicular to  $AB$ .

Then  $a > CD$ ,  $\frac{\sinh b \sin A}{\sinh a} < 1$ ;  $\cot \frac{1}{2} C > 0$ ; and  $\tanh \frac{1}{2} c > 0$ .

$$\sin B = \frac{\sinh b \sin A}{\sinh a}$$

$$\cos \frac{1}{2} C = \frac{\tan \frac{1}{2} (A - B) \sinh \frac{1}{2} (a + b)}{\sinh \frac{1}{2} (a - b)}$$

$$\tanh \frac{1}{2} c = \frac{\tanh \frac{1}{2} (a - b) \sin \frac{1}{2} (A + B)}{\sin \frac{1}{2} (A - B)}$$

CASE 3.—Given  $a, b, C$ .  $2\Delta = \pi - (A + B + C)$ .

$$\tan \frac{1}{2} (A + B) = \cot \frac{1}{2} C \frac{\cosh \frac{1}{2} (a - b)}{\cosh \frac{1}{2} (a + b)}$$

$$\tan \frac{1}{2} (A - B) = \cot \frac{1}{2} C \frac{\sinh \frac{1}{2} (a - b)}{\sinh \frac{1}{2} (a + b)}$$

$$\tanh \frac{1}{2} c = \sqrt{\frac{\sin \Delta \sin (\Delta + C)}{\sin (\Delta + A) \sin (\Delta + B)}}$$

CASE 4.—Given  $A, B, c$ .  $A + B < \pi$  and  $DBC = DBC'$ . The angle  $DBC$  is the angle between the geodesic  $DB$  drawn perpendicular to  $AC$  and the geodesic  $BC$  drawn parallel to  $AC$ .

$$\tanh \frac{1}{2} (a + b) = \tanh \frac{1}{2} c \frac{\cos \frac{1}{2} (A - B)}{\cos \frac{1}{2} (A + B)}$$

$$\tanh \frac{1}{2} (a - b) = \tanh \frac{1}{2} c \frac{\sin \frac{1}{2} (A - B)}{\sin \frac{1}{2} (A + B)}$$

$$\tan \frac{1}{2} C = \sqrt{\frac{\sinh (p - a) \sinh (p - b)}{\sinh p \sinh (p - c)}}$$

CASE 5.—Given  $A, B, a$ .  $a > CD$  and  $A + B < \pi$ .

Solve the two right triangles formed by the geodesic line  $CD$  drawn perpendicular to  $AB$ .

CASE 6.—Given  $A, B, C$ .  $A + B + C < \pi$ .

$$\tanh \frac{1}{2} a = \sqrt{\frac{\sin \Delta \sin (\Delta + A)}{\sin (\Delta + B) \sin (\Delta + C)}}$$

## II.—FORMULAS FOR THE SOLUTION OF THE CUBIC.

If a cubic equation is given in the form

$$x^3 + ax^2 + bx + c = 0,$$

it can be reduced by the substitution  $z = x + \frac{a}{3}$  to the simpler form

$$x^3 + px + q = 0,$$

<sup>1</sup>Taken from Des Ingenieurs Taschenbuch der Rütte, Berlin, 18th edition.

CASE 1.—When  $x^3 + px \pm q = 0$ ;  $p$  and  $q$  positive. Compute the auxiliary variable  $u$  from  $\sinh u = \frac{\frac{1}{2}q}{\frac{1}{8}p(\frac{1}{8}p)^{1/2}}$ ; then the roots are

$$x_1 = \mp 2 \sqrt{\frac{1}{8}p} \sinh \frac{1}{3}u.$$

$$x_2 = \pm \sqrt{\frac{1}{8}p} \sinh \frac{1}{3}u + i \sqrt{p} \cosh \frac{1}{3}u.$$

$$x_3 = \pm \sqrt{\frac{1}{8}p} \sinh \frac{1}{3}u - i \sqrt{p} \cosh \frac{1}{3}u.$$

CASE 2.—When  $x^3 - px \pm q = 0$ ;  $p$  and  $q$  positive.  $(\frac{1}{8}p)^3 < (\frac{1}{2}q)^2$ . Compute  $u$  from  $\cosh u = \frac{\frac{1}{2}q}{\frac{1}{8}p(\frac{1}{8}p)^{1/2}}$ ; then the roots are

$$x_1 = \mp 2 \sqrt{\frac{1}{8}p} \cosh \frac{1}{3}u.$$

$$x_2 = \pm \sqrt{\frac{1}{8}p} \cosh \frac{1}{3}u + i \sqrt{p} \sinh \frac{1}{3}u.$$

$$x_3 = \pm \sqrt{\frac{1}{8}p} \cosh \frac{1}{3}u - i \sqrt{p} \sinh \frac{1}{3}u.$$

CASE 3.—When  $x^3 - px \pm q = 0$ ;  $p$  and  $q$  positive.  $(\frac{1}{8}p)^3 > (\frac{1}{2}q)^2$ . Compute the angle  $u$  from  $\cos u = \frac{\frac{1}{2}q}{\frac{1}{8}p(\frac{1}{8}p)^{1/2}}$ ; then the roots are

$$x_1 = \mp 2 \sqrt{\frac{1}{8}p} \cos \frac{1}{3}u.$$

$$x_2 = \mp 2 \sqrt{\frac{1}{8}p} \cos (\frac{1}{3}u + 120^\circ).$$

$$x_3 = \mp 2 \sqrt{\frac{1}{8}p} \cos (\frac{1}{3}u + 240^\circ).$$

CASE 4.—When  $x^3 - px \pm q = 0$ ;  $p$  and  $q$  positive.  $(\frac{1}{8}p)^3 = (\frac{1}{2}q)^2$ .

$$x_1 = \mp 2 \sqrt{\frac{1}{8}p}.$$

$$x_2 = x_3 = \pm \sqrt{\frac{1}{8}p}.$$

For applications of hyperbolic and circular functions to the solution of the cubic whose coefficients are general (*i. e.*, real or complex), see a brief paper by Mr. W. D. Lambert in *American Mathematical Monthly* for April, 1906.



## GEOMETRICAL ILLUSTRATIONS OF HYPERBOLIC FUNCTIONS.

The algebraic relationship of the hyperbolic functions to the circular functions has been discussed in the section on definitions and formulas. A close relationship also exists between the elliptic functions and the hyperbolic functions. Thus it may be shown that the elliptic integral of the first kind,

$$u = \int \frac{d\phi}{\sqrt{1 - k^2 \sin^2 \phi}},$$

in which  $k$  is the modulus and  $\phi$  the amplitude, reduces to  $u = \int d\phi$  when  $k = 1$ . The elliptic functions thus degenerate into the hyperbolic functions when the modulus is equal to unity. A case in point is the elastica, the equation of which takes the form of an elliptic integral, excepting when the modulus is unity. It then reduces to the two equations

$$\frac{x}{a} = u - 2 \tanh u, \quad \frac{y}{a} = \frac{2}{\cosh u},$$

which is a syntactrix described by the free end of a rod whose middle point traces out the tractory.<sup>1</sup>

Ligowski gives the following easy geometrical method of demonstrating the relations between the hyperbolic and circular functions. Let the equation of the circle of unit radius be

$$x_c^2 + y_c^2 = 1,$$

and call  $u_c$  the arc of this circle from the positive  $x$  axis to the point  $x_c, y_c$ .

Then, of course, the circle may be represented by the two equations

$$x_c = \cos u_c; \quad y_c = \sin u_c.$$

Now, the area of the circular sector, whose

chord is  $2y_c$ , is  $\frac{2y_c \cdot 1}{2} = u_c$ , so that  $x_c$  and

$y_c$  may be regarded as the cosine and sine of a sector  $u_c$ . The ellipse may be derived from the unit circle by multiplying the ordinates  $y_c$  by  $b$ . Hence, in the ellipse, the area of the sector subtended by the chord  $2y_c$  is, say,  $u_e$  and  $u_e = bu_c$ .

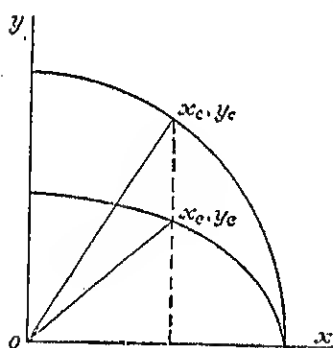


FIG. 4.

<sup>1</sup> If in these equations  $m$  is substituted for 2 they represent any syntactrix. The two equations, with this substitution, can be combined to the following:

$$\frac{(au - x)^2}{a^2 m^2} + \frac{y^2}{a^2 m^2} = 1,$$

showing that the curve is traced by a point on a circle of radius  $am$  whose center is in motion. It is noteworthy that if in this equation the hyperbolic sector  $u$  is replaced by a circular sector  $\phi$ , the new equation represents a prolate or a curtate cycloid, or better the synecycloid. Thus the syntactrix may be considered as a synecycloid with an infinite period.

Thus

$$x_e = \cos u_e = \cos \frac{u_e}{b},$$

$$y_e = \sin u_e = \frac{y_e}{b} = \sin \frac{u_e}{b},$$

so that for the ellipse,

$$x_e^2 + \frac{y_e^2}{b^2} = 1,$$

$$x_e = x_e = \cos \frac{u_e}{b}; \quad y_e = b \sin \frac{u_e}{b}.$$

The equation

$$x^2 - y^2 = 1$$

represents an equilateral hyperbola, and if  $u$  is the area of the hyperbolic sector whose chord is  $2y$ , then there can be no objection to writing

$$x = \cosh u; \quad y = \sinh u,$$

where  $\cosh$  and  $\sinh$  are functions whose nature is still to be determined. The most evident relation is

$$\cosh^2 u - \sinh^2 u = 1.$$

Now if  $i = \sqrt{-1}$ , the hyperbola may be written

$$x^2 + \frac{y^2}{i^2} = 1,$$

which is an ellipse whose major axis is unity and whose minor axis is  $i$ . Comparing this with the ellipse discussed above, it appears at once that

$$x = \cosh u = \cos \frac{u}{i},$$

$$y = \sinh u = i \sin \frac{u}{i},$$

or, in an equivalent form,

$$\begin{aligned} \cosh u &= \cos iu; \quad \sinh u = -i \sin iu, \\ \cosh iu &= \cos u; \quad \sinh iu = i \sin u. \end{aligned}$$

The investigation of  $\cosh u$  and  $\sinh u$  can be completed in various ways; for example, by writing out the series for  $\cos iu$  and  $-i \sin iu$  and showing that their sum or difference is  $e^{\pm u}$ .

The geometrical properties of the hyperbolic functions themselves are commonly discussed in reference to the equilateral hyperbola. They could also be derived from the geometry of the ellipse without reference to the hyperbola; but a more perspicuous method seems to be to study the relations of these functions to both curves at the same time.<sup>1</sup>

In any ellipse,

$$\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1,$$

<sup>1</sup> See Bull. Geol. Soc. Am., vol. 2, 1891, p. 49, and Am. Jour. Sci., vol. 46, 1893, p. 337.

the area  $\pi$  may be chosen as the unit area, so that the equation of the curve becomes

$$a^2 x^2 + \frac{y^2}{a^2} = 1.$$

By varying the value of  $a$  in this equation a family of ellipses is obtained each of area  $\pi$ , all with the same center and all with axes lying in the axes of coördinates. The envelope of this system of curves is the hyperbola  $xy = \frac{1}{2}$ , and this may be conceived as generated by the motion of a single point. The coördinates of the point  $P_1$ , at which the hyperbola is tangent to the ellipse, are

$$x_1 = \frac{1}{\sqrt{2}a} \quad y_1 = \frac{a}{\sqrt{2}};$$

and the coördinates of the point  $c$  at which the hyperbola is tangent to the unit circle, are

$$x = y = \frac{1}{\sqrt{2}}.$$

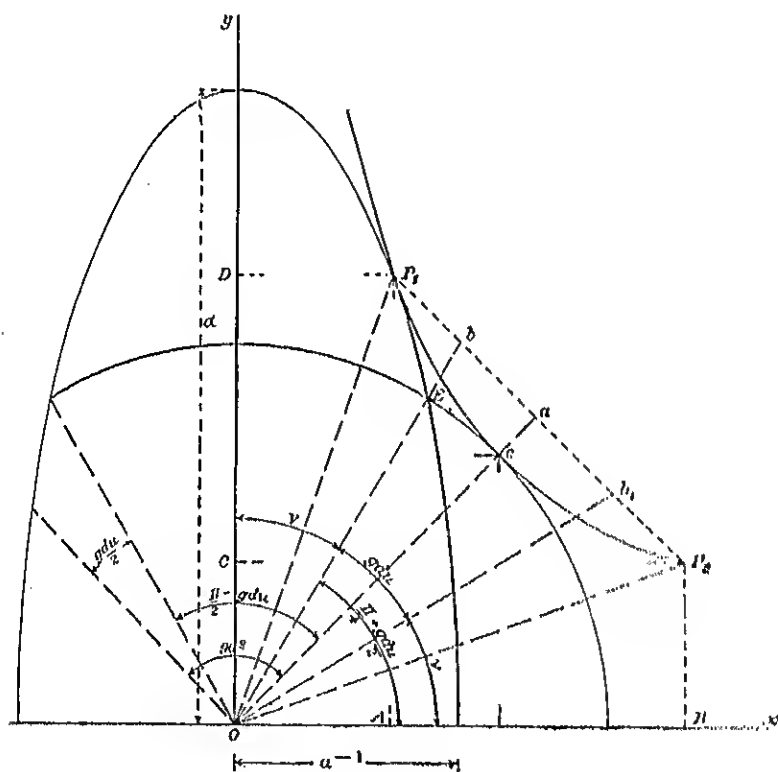


FIG. 5.

If the hyperbola is conceived as generated by the point  $c$  in moving from its original position to  $P_1$  (or as a "line of flow"), its radius vector sweeps over an hyperbolic sector  $ocP_1$ . If this area is called  $\frac{n}{2}$ , then by a well-known formula,

$$du = x dy - y dx,$$

and because  $xy = \frac{1}{2}$ ,

$$du = \frac{1}{2} \left( \frac{dy}{y} - \frac{dx}{x} \right).$$

Since no integration constant is required,

$$u = \frac{1}{2} \log \frac{y_1}{x_1} = \frac{1}{2} \log u^2 \text{ or } u = e^u.$$

The area  $u$  is the sector  $OP_1cP_2$ , where the coördinates of  $P_2$  are  $x_2 = y_1$  and  $y_2 = x_1$ . It is noteworthy that two other areas,  $AP_1cP_2B$  and  $CDP_1cP_2$ , have this same value, for evidently

$$\int_{x_1}^{x_2} y \, dx = \int_{y_1}^{y_2} x \, dy = \log u = u.$$

The length of the chord  $P_1P_2$  is

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = u - u^{-1},$$

and half of this, or  $P_1a$ , is the hyperbolic sine which may evidently be put in the form

$$\sinh u = \frac{e^u - e^{-u}}{2}.$$

Since the curve  $P_1cP_2$  is an hyperbola,

$$oa^2 - aP_1^2 = 1,$$

and therefore

$$oa = \sqrt{1 + \sinh^2 u} = \frac{e^u + e^{-u}}{2} = \cosh u.$$

The diameters connecting the points of intersection of the unit circle and the ellipse whose axes are  $a$  and  $a^{-1}$ , may be called the isocyclic diameters of the ellipse, because the circle and the ellipse have the same area. These diameters are not conjugate. If the ellipse is conceived as the section on the greatest and least axes of an ellipsoid of unit volume, the isocyclic diameters are the traces of the circular sections of the ellipsoid. The coördinates of one of the points of intersection, say  $E$ , are

$$x = \frac{1}{\sqrt{a^2 + 1}}; \quad y = \frac{a}{\sqrt{a^2 + 1}},$$

and therefore the angle  $v$ , which the vector  $OE$  makes with the major axis of the ellipse, is given by the relation

$$\tan v = a^{-1} = e^{-u},$$

and it follows that

$$\tan \left( \frac{\pi}{2} - 2v \right) = \frac{1}{2} (\cot v - \tan v) = \sinh u.$$

This angle  $\left( \frac{\pi}{2} - 2v \right)$  is  $gd \, u$ , or the gudermannian of  $u$ , so that in any

ellipse whatever the angle made by any line parallel to one isocyclic diameter with a perpendicular on the other isocyclic diameter is the gudermannian of the natural logarithm of the semi-major axis, this being expressed in terms of the isocyclic radius, which in the general case is the square root of the product of the semi-axes.<sup>1</sup> In the diagram the gudermannian  $hob_1$  is shown as bisected by the axis of the hyperbola, and it is worth remarking that if the ellipse were to be distorted into a circle by compressing the major axis and elongating the minor axis, the line  $ob$  would be brought into coincidence with  $ob_1$ , so that  $gd\ u$  can be defined as the angle through which an isocyclic diameter has swept when the ellipse has been derived from a circle by rotational plane strain.

The angle  $45^\circ + \frac{gd\ u}{2}$  which occurs in the formula for meridional parts is the angle made by either isocyclic diameter of the ellipse with the minor axis, and the tangent of this angle is the semi-major axis  $a$ .

The twofold relations of the hyperbolic functions to the hyperbola and the ellipse are illustrated in a somewhat different manner in figure 6.

Here the curve  $p_1 c p_2$  is an arc of an hyperbola  $x^2 - y^2 = 1$ . If the area of the sector  $o p_1 c p_2$  is called  $u$ ,  $ap_1 = \sinh u$  and  $op_2 = \cosh u$ . Make  $bc = p_1 a$  and draw the associated ellipse shown in the diagram. Then the angle  $boc = gd\ u$ ;  $bo = \cosh u$  and

$$\begin{aligned}\tan gd\ u &= \sinh u \\ \sec gd\ u &= \cosh u \\ \sin gd\ u &= \tanh u.\end{aligned}$$

The ellipse has corresponding properties. Since the gudermannian is the angle between either isocyclic diameter and a line perpendicular to the other, the line  $ob$  may be regarded as coinciding with one isocyclic diameter and the axis of abscissas with the other. The major axis of the ellipse then bisects

<sup>1</sup> The isocyclic diameter used in this illustration of hyperbolic functions lies in the circular section of a shear ellipsoid, or an ellipsoid in which the mean axis is a mean proportional between the greatest and least axes. The position of the circular section of the general ellipsoid is also readily expressed in terms of hyperbolic functions. Let the equation of the ellipsoid be

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1; \quad a > b > c.$$

If  $\frac{b}{c} = \cosh u_1$ , and  $\frac{a}{b} = \cosh u_2$ ,

the angle  $\nu$  which the circular section makes with the greatest axis is given by

$$\tan \nu = \frac{1}{i} \tanh i\nu = \frac{b \cosh u_2 - a \cosh u_1}{c \cosh u_2 - b \cosh u_1} = \frac{\tanh u_1}{\sinh u_2}.$$

If  $u_1 = u_2$  and  $\frac{a}{b} = a$  this expression reduces to  $\tan \nu = a^{-1}$ , or to the case of the shear ellipsoid.

the angle  $90^\circ - gdu$ , its magnitude is  $2e^u$ , and the equation of the ellipse is

$$x^2 + 4xy \tan gdu + y^2 (4 \tan^2 gdu + 1) = 1.$$

By varying the value of  $\tan gdu$  (or  $\sinh u$ ) a system of ellipses is obtained whose envelopes are  $p = \pm 1$ , so that if any one of the ellipses is supposed to be derived from the circle by distortion, the process is that generally known as "shearing motion or scission."

If the points in the circle are sought which correspond to the points on the

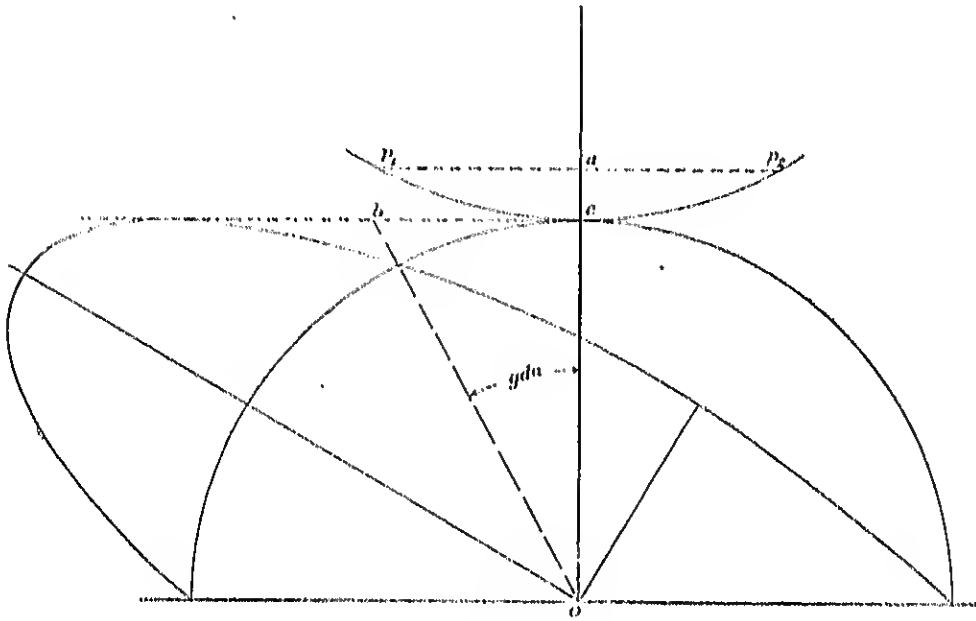


FIG. 6.

major axis of the ellipsoid, it will be found that the angle between the two positions (the angle of rotation) is equal to the *germanian*.<sup>1</sup>

If instead of the horizontal, the vertical line in figure 6 had been taken as coinciding with the isocyclic diameter of the ellipse, the result would have been the discovery of a system of ellipses whose envelopes are  $p = \pm 1$ , similar in all respects excepting orientation to that discussed.

<sup>1</sup> Love's Treatise on the Theory of Elasticity, vol. I, p. 43.

## METHODS OF INTERPOLATION.

It is not easy to describe the use of the tables which follow without some notes on the methods of interpolation with reference to which they are arranged. In all of them the argument advances by equal increments, each equal, say, to  $\omega$ . It is required to find a value of the function  $F$  intermediate between two tabulated values,  $F_0$  and  $F_1$ , corresponding to a fractional value of the argument or to  $n\omega$ , where  $n$  is always less than unity, and preferably less than one-half.

Let  $F_n$  be the value of the function to be determined; let  $F_{-1}$  and  $F_{-2}$  be tabulated values of  $F$  immediately preceding  $F_0$ , and let  $F_1$ ,  $F_2$  be values immediately following  $F_0$ . Denote  $F_1 - F_0$  by  $a_0$ , other first differences ( $\Delta'$ ) being similarly represented. If also  $a_2 - a_1 = b_0$ ,  $b_1 - b_0 = c_0$ , etc., the whole system of functions and differences is shown in the following schedule:<sup>1</sup>

$F$	$\Delta'$	$\Delta''$	$\Delta'''$	$\Delta^{iv}$	$\Delta^v$	$\Delta^vi$
$F_{-2}$		$b''$		$d''$		$f''$
	$a''$		$c''$		$e''$	
$F_{-1}$		$b'$		$d'$		$f'$
	$a'$		$c'$		$e'$	
$F_0$		$b_0$		$d_0$		$f_0$
	$a_1$		$c_1$		$e_1$	
$F_1$		$b_1$		$d_1$		$f_1$
	$a_2$		$c_2$		$e_2$	
$F_2$		$b_2$		$d_2$		$f_2$

The most familiar formula of interpolation is due to Newton, and in the above notation it may be written thus:

$$\begin{aligned}
 F_n - F_0 = & na_1 + \frac{n(n-1)}{2!} b_1 + \frac{n(n-1)(n-2)}{3!} c_1 \\
 & + \frac{n(n-1)(n-2)(n-3)}{4!} d_1 + \dots
 \end{aligned}$$

<sup>1</sup>The notation and general outline of treatment here presented closely follow Mr. Herbert L. Rice's treatise, *Theory and Practice of Interpolation*, 1899. The Nichols Press, Lynn, Massachusetts.

The coefficients are those of the binomial theorem. This formula is applicable to the first intervals of a series, which is not the case with any other mode of interpolation. It may also be adapted to the last intervals by substituting  $-n$  for  $n$  and  $a', b', c', d', \dots$  for  $a_1, b_1, c_1, d_1, \dots$ . In systematic interpolation, such as is involved in the construction of tables, it is usual to employ the more rapidly converging formulas of Stirling or Bessel; but when a computing machine and a table of products are available it is sometimes less laborious to compute an extra term of Newton's formula than to calculate and apply the mean differences called for by the other methods. Both Stirling's and Bessel's formulas can be derived from Newton's by known relations between the several differences.

In Stirling's formula the mean of the first differences next preceding and following  $F_0$  is made use of instead of only the latter, as in Newton's formula. The third differences are similarly treated, so that  $a_0, c_0$ , etc., being new quantities, are defined by

$$\frac{a' + a_1}{2} = a_0; \quad \frac{c' + c_1}{2} = c_0, \text{ etc.}$$

These mean values are used in conjunction with the even differences on the same horizontal line with  $F_0$  in the schedule, and Stirling's formula is

$$F_n = F_0 + na_0 + \frac{n^2}{2!} b_0 + \frac{n(n^2-1)}{3!} c_0 + \frac{n^2(n^2-1)}{4!} d_0 \\ + \frac{n(n^2-1)(n^2-4)}{5!} e_0 + \dots$$

To interpolate backward it is only needful to substitute  $-n$  for  $n$ .

In Bessel's formula use is made of mean differences of the even orders, and if  $b, d$ , etc., are these means they are defined in terms of the scheduled differences, thus:

$$\frac{b_0 + b_1}{2} = b; \quad \frac{d_0 + d_1}{2} = d, \text{ etc.}$$

They are used in conjunction with the simple odd differences  $a_1, c_1$ , etc., and the formula is

$$F_n = F_0 + na_1 + \frac{n(n-1)}{2!} b + \frac{n(n-1)(n-2)}{3!} c_1 + \frac{(n+1)n(n-1)(n-2)}{4!} d \\ + \frac{(n+1)n(n-1)(n-2)(n-3)}{5!} e_1 + \dots$$

When  $n = \frac{1}{2}$ , or for interpolation to the middle of an interval, the coefficient of  $c_1$  vanishes and  $F_n = F_0$  is independent of third differences, which is clearly a great advantage. In general this method is very advantageous when  $n$  approaches one-half, while Stirling's formula is preferred for small values of  $n$ .



When Bessel's formula is used for backward interpolation, it may be written

$$F_n - F_0 = -na' + \frac{n(n-1)}{2!} \left( \frac{h_n}{2} + b' \right) - \frac{n(n-1)(n-2)}{3!} c' + \dots,$$

$n$  being taken as positive.

A distinct method of interpolation is founded directly upon Taylor's theorem. If  $F'_0, F''_0$ , etc., are the successive derivatives of  $F_0$ , and  $\omega$  is the constant increment of the argument, this fundamental theorem may be written

$$F_n - F_0 = n\omega F'_0 + \frac{n^2\omega^2}{2!} F''_0 + \frac{n^3\omega^3}{3!} F'''_0 + \frac{n^4\omega^4}{4!} F^{(4)}_0 + \dots (a),$$

and this becomes an interpolation formula when the derivatives are expressed in terms of the differences. This is readily accomplished to any degree of exactness whenever the differences become rigorously or sensibly constant at some particular order and the tabular interval is small relatively to the period of the function. To find the numerical values of the derivatives it is not necessary that the analytical expression of the function should be known; for, rearranging the terms of the formula of Bessel and Stirling according to ascending powers of  $n$  and comparing coefficients,

(Bessel.)	(Stirling.)
$F'_0 = \frac{1}{\omega} (a_1 - \frac{1}{2}b + \frac{1}{4}c_1 + \frac{1}{2}d - \frac{1}{2}e + \dots)$	$= \frac{1}{\omega} (a_0 - \frac{1}{4}c_0 + \frac{1}{8}c_2 - \dots)$
$F''_0 = \frac{1}{\omega^2} (b - \frac{1}{2}c_1 - \frac{1}{2}d + \frac{1}{2}e + \dots)$	$= \frac{1}{\omega^2} (b_0 - \frac{1}{2}d_0 + \dots)$
$F'''_0 = \frac{1}{\omega^3} (c_1 - \frac{1}{2}d + \dots)$	$= \frac{1}{\omega^3} (c_0 - \frac{1}{4}e_0 + \dots)$
$F^{(4)}_0 = \frac{1}{\omega^4} (d - \frac{1}{2}e + \dots)$	$= \frac{1}{\omega^4} (d_0 - \dots)$
$F^{(5)}_0 = \frac{1}{\omega^5} (e - \dots)$	$= \frac{1}{\omega^5} (e_0 - \dots)$

Hence, to compute the first derivative, say from Stirling's formula, when the 6th differences and  $\frac{1}{8}d_0$  of the mean of the corresponding third differences are negligible, it is only needful to take the mean of the first differences preceding and following the tabular value of the function, subtract from it one-sixth ( $\frac{1}{6}$ ) of the mean of the corresponding third differences, and divide the result by  $\omega$ .

Newton's formula gives for arguments near the beginning of the series of tabular values:

$$\begin{aligned} F'_0 &= \frac{1}{\omega} (a_1 - \frac{1}{2}b + \frac{1}{3}c_1 - \frac{1}{4}d_1 + \frac{1}{5}e_1 - \dots) \\ F''_0 &= \frac{1}{\omega^2} (b_1 - c_2 + \frac{1}{2}d_2 - \frac{1}{6}e_3 + \dots) \\ F'''_0 &= \frac{1}{\omega^3} (c_1 - \frac{3}{2}d_2 + \frac{7}{4}e_3 - \dots) \end{aligned}$$

$$F_0^{(0)} = \frac{1}{\omega^4} (d_2 - 2c_3 + \dots)$$

$$I_0^v = \frac{1}{\omega^3} (e_3 - \dots),$$

and for arguments near the end of the series of tabular values,

$$I_0' = \frac{1}{\omega} (a' + \frac{1}{2} b' + \frac{1}{3} c'' + \frac{1}{4} a''' + \frac{1}{5} c''' + \dots)$$

$$F_0'' = \frac{1}{\omega^2} (b' + c'' + \frac{1}{2} a'' + \frac{6}{8} c''' + \dots)$$

$$F_0''' = \frac{1}{\omega^3} (c'' + \frac{3}{2} a'' + \frac{3}{2} c''' + \dots)$$

$$F_0^{(n)} = \frac{1}{n!} (d'' + 2d''' + \dots)$$

$$F_0^v = \frac{1}{\omega_0^2} (\omega_0'^2 + \dots),$$

The differences of the derivatives may of course be found and discussed in the same manner as those of any other function, and the higher derivatives,  $J_n'', J_n''', \dots$  can be expressed in terms of the differences of  $J_n'$ . To distinguish the differences of  $J''$  from those of  $J'$ , they may be denoted by Greek letters, and the notation is exhibited in the following scheme :

*Inf.*

11"

*Page 1*

3<sup>e</sup>

Y

$$a_1 + \dots + a' + \dots + 2a_0$$

20

$R_0$

•

[illegible]

1

$\gamma_1$

$$\gamma_1 + \gamma' = 1 - 2\gamma_2$$

11

$B_1$

Using Stirling's formulæ, page xxxvi, the successive derivatives inclusive of fifth differences are now

$$J_0'''' = \frac{1}{\omega} (u_0 - \frac{1}{\omega} \gamma_0); J_0'''' = \frac{1}{\omega^2} (\beta_0 - \frac{1}{\omega} \delta_0); J_0'''' = \frac{1}{\omega^3} (\gamma_0); J_0'''' = \frac{1}{\omega^4} (\delta_0);$$

and the interpolation formula may be written

$$F_n = F_0 + n \omega F_0' + \frac{n^2 \omega}{2!} (\alpha_0 + \frac{1}{2} \gamma_0) + \frac{n^3 \omega}{3!} (\beta_0 + \frac{1}{2} \delta_0) + \frac{n^4 \omega}{4!} \gamma_0 + \frac{n^5 \omega}{5!} \delta_0;$$

or, neglecting fifth differences,

$$F_n = F_0 + n \omega \left[ F_0' + \frac{n}{2} \alpha_0 + \frac{n^2}{6} \beta_0 + \frac{n}{12} \left( \frac{n^2}{2} - 1 \right) \gamma_0 \right],$$

and for backward interpolation

$$F_{-n} = F_0 - n\omega \left[ F_0' - \frac{n}{2} \alpha_0 + \frac{n^2}{6} \beta_0 - \frac{n}{12} \left( \frac{n^2}{3} - 1 \right) \gamma_0 \right],$$

In the tables which follow, the first derivatives multiplied by  $\omega$  are tabulated in units of the last decimal place of the tabulated function (except Table VII), and the remaining quantities required in the computation can be found by mere inspection. The higher order of differences will be needed only for a very few arguments at the beginning or end of those tabular values whose numerical magnitudes approach 0 or  $\infty$ . For the remaining arguments it will be found that the  $\frac{1}{8}$  part of the second difference of  $\omega F''$  is not great enough to influence the result, and it is therefore sufficient to use

$$\left. \begin{aligned} F_n &= F_0 + n\omega \left( F'_0 + \frac{n}{2} a_0 \right) \\ F_{-n} &= F_0 - n\omega \left( F'_0 - \frac{n}{2} a_0 \right) \end{aligned} \right\} \dots \dots \dots (b),$$

$\omega a_0$  being the mean first difference of  $\omega F'$  corresponding to  $F'_0$ . This formula is rigorous when third differences are zero. In most cases  $\frac{n}{2} \omega a_0$  can be found mentally, and since  $\omega \left( F'_0 + \frac{n}{2} a_0 \right)$  is here to be regarded as an interpolated value of  $\omega F'_0$ , no confusion can arise as to the sign of the correction. It thus becomes almost as easy to include  $\omega a_0$  in the computation as to omit it. A convenient rule is: Find by linear interpolation the value  $\omega F'$  for one-half the interval  $\left( \frac{n}{2} \right)$ ; multiply this interpolated value by the entire interval ( $n$ ) and apply the product to the tabular value of the function, either positively or negatively, according as the function is increasing or decreasing. To illustrate the application of this rule, find  $\log_{10} \sinh 0.00304$ . In this case  $n = 0.4$  and the table gives

$$F_0 = 7.47712; \quad \omega F'_0 = 1447.7; \quad \omega a_0 = -48.3,$$

the last two quantities being expressed in units of the fifth decimal place. Interpolating  $\omega F'$  linearly for one-half the interval,

$$\omega F'_{\frac{n}{2}} = \omega \left( F'_0 + \frac{n}{2} a_0 \right) = 1447.7 - 0.2 \times 48.3 = 1438.0;$$

multiplying this value by  $n$  and adding the result to the tabular value of the function, there results

$$F_n = 1438.0 \times 0.4 + 7.47712 = 7.48287.$$

The corresponding difference formula (Bessel's) is

$$F_n = F_0 + n \left[ a_1 - \frac{(1-n)}{2} b \right].$$

The derivative formula (b) with two terms has the advantage of being much more convenient than the difference formula, while the accuracy of the two is the same (five-eighths of a unit) when the derivatives are tabulated to the

same order of decimal as the function. In the case of linear interpolation, however, it is in general more accurate to use the differences, the maximum error of the difference formula being one-half of a unit and that of the derivative formula three-fourths of a unit in the next succeeding decimal place. The accuracy of the two formulas is the same when the next succeeding decimal of the derivative is tabulated. The error of the derivative formula is then simply the error of the tabular value, while the error of the difference formula may be  $=$ ,  $>$ , or  $<$  than that of the tabular value, but is never greater than one-half of a unit.

Interpolation formulas which are applicable only to a single function are rarely advantageous, because as much time is often consumed in looking them up as is saved by employing them; but some formulas applicable to hyperbolic functions are so simple that when once suggested they can hardly be forgotten. Thus, Taylor's theorem gives at once

$$\cosh (u + u\omega) - \cosh u = u\omega \sinh u + \frac{u^2\omega^2}{2!} \cosh u + \frac{u^3\omega^3}{3!} \sinh u + \dots,$$

and the form for the sine is of course similar. Again, when, as here, the cosine is tabulated with an argument in terms of radians,

$$\cos (u + u\omega) - \cos u = -u\omega \sin u - \frac{u^2\omega^2}{2!} \cos u + \frac{u^3\omega^3}{3!} \sin u + \dots,$$

the series for the sine being similar.

So, too,

$$\begin{aligned} \log_e (u + u\omega) - \log_e u &= \log_e \left( 1 + \frac{u\omega}{u} \right) \\ &= \frac{u\omega}{u} - \frac{1}{2} \frac{u^2\omega^2}{u^2} + \frac{1}{3} \frac{u^3\omega^3}{u^3} - \frac{1}{4} \frac{u^4\omega^4}{u^4} + \dots \quad \left( \frac{u^2}{u^2} < 1 \right) \end{aligned}$$

Simplest of all is the exponential,

$$\begin{aligned} e^{u + u\omega} &= e^u = e^u (e^{u\omega} - 1) = e^u \left( u\omega + \frac{u^2\omega^2}{2!} + \frac{u^3\omega^3}{3!} + \dots \right) \dots (c), \\ &= e^u (+0.01u + 0.000,05u^2 + 0.000,000,167u^3 + \dots), \quad (u = 0.01) \\ &= e^u (+0.001u + 0.000,000,5u^2 + \dots), \quad (u = 0.001) \end{aligned}$$

The series in  $u\omega$  may be replaced by  $h$ , and this may have any finite value. Especially when a computing machine is available, this formula is easily applied and is, of course, rigorous.

From time to time inverse interpolation by a method more accurate than first differences is called for; indeed, whenever interpolation of a function by higher differences is needful, it is equally needful that the argument corresponding to a given function should be ascertained by a like process. The method ordinarily pursued in such cases is to estimate two values of the argument, one a little greater and the other a little less than that of the required argument, interpolate corresponding values of the function, and finally interpolate linearly over the reduced interval for a final value of the argument.

Another method consists in interpolating values of the function and its derivatives for an approximate value of the required interval and then computing a correction to this approximate value by means of a reversed Taylor's series.<sup>1</sup>

If second differences only are to be taken into account, the usual method of procedure is to estimate an approximate value of  $n$ , say  $n'$ , and with this estimated value we interpolate linearly as before and find the value of  ${}^w F_{n'}^{(2)}$

corresponding to one-half of the estimated interval  $\left(\frac{n'}{2}\right)$ . Then the required interval ( $n$ ) is equal to the difference between the given value and the nearest tabular of the function divided by  ${}^w F_{n'}^{(2)}$ . This method is in fact simply the reverse of the one for direct interpolation. A recomputation is of course necessary if the values of  $n$  and  $n'$  are not practically the same. As an illustration, find  $n$  when  $\log_{10} \sinh n = 7.48287$ . We first compute

$$n' = \frac{7.48287 - 7.47712}{1.438,0} = 0.4,$$

then the value of  ${}^w F_{n'}^{(2)}$  in terms of the last tabular unit is found as before

by linear interpolation to be 1438,0. Hence

$$n = \frac{7.48287 - 7.47712}{1438,0} = 0.40 \text{ and } n = 0.00304.$$

Since the estimated and computed values of the interval agree, there is no need of a recomputation.

The methods which are based upon an estimated value of the argument are unsystematic and clumsy. It is much better to use a formula which gives the required result by a direct and rigorous method. To find such a formula, divide Taylor's series (eq. a) by  ${}^w F_0^{(2)}$ , and put

$$n_1 = \frac{F_n - F_0}{{}^w F_0^{(2)}}, f_2 = \frac{{}^w F_0^{(4)}}{2 {}^w F_0^{(2)}}, f_3 = \frac{{}^w F_0^{(6)}}{6 {}^w F_0^{(2)}}, f_4 = \frac{{}^w F_0^{(8)}}{24 {}^w F_0^{(2)}}, f_5 = \frac{{}^w F_0^{(10)}}{120 {}^w F_0^{(2)}};$$

then the interpolation formula may be written

$$n_1 = n + f_2 n^2 + f_3 n^3 + f_4 n^4 + f_5 n^5.$$

Reversing this series in accordance with the relation,<sup>2</sup>

$$\begin{aligned} x &= \frac{y}{a_0} + \frac{y^2}{a_0^2} (-a_1) + \frac{y^3}{a_0^3} (-a_0 a_2 + 2 a_1^2) \\ &\quad + \frac{y^4}{a_0^4} (-a_0^2 a_3 + 5 a_0 a_1 a_2 - 5 a_1^3) \\ &\quad + \frac{y^5}{a_0^5} (-a_0^3 a_4 + 3 a_0^2 (a_2^2 + 2 a_1 a_3) - 21 a_0 a_1^2 a_2 + 14 a_1^4), \end{aligned}$$

<sup>1</sup> Rice's Theory and Practice of Interpolation, section 83.

<sup>2</sup> Prof. James McMahon: "On the General Term in the Reversion of Series," Bull. Am. Math. Soc., April, 1894.

which is the reversed series of

$$y = a_0 x + a_1 x^2 + a_2 x^3 + a_3 x^4 + a_4 x^5;$$

and rearranging the terms,<sup>1</sup>

$$\begin{aligned} n = n_1 + n_1 [-n_1 f_2 + 2 (n_1 f_2)^2 - 5 (n_1 f_2)^3 + 14 (n_1 f_2)^4 + \dots] \\ + n_1^2 [n_1 f_3 (-1 + 5 (n_1 f_2) - 21 (n_1 f_2)^2 + \dots)] \\ + n_1^3 [n_1 f_4 (-1 + 6 n_1 f_2) + 3 (n_1 f_3)^2 + \dots] \\ + n_1^4 [-n_1 f_5 + \dots] \quad \dots \quad \dots \quad \dots \quad (d). \end{aligned}$$

In the actual computation it is convenient to put

$$r = \frac{n_1}{2 \omega F'_0};$$

then, when successive values of  $\omega F'_n$  are tabulated in units of the last decimal place, and Stirling's coefficients are used,

$$\begin{aligned} n_1 f_2 &= r \omega (a_0 - \tfrac{1}{2} \gamma_0) & n_1 f_3 &= \tfrac{1}{6} r \omega (\beta_0 - \tfrac{1}{2} \delta_0) \\ n_1 f_4 &= \tfrac{1}{24} r \omega \gamma_0 & n_1 f_5 &= \tfrac{1}{80} r \omega \delta_0. \end{aligned}$$

The formula is rigorous inclusive of fifth differences, and does not require the computation of an approximate value of  $n$ . It is applicable to any function or series of tabulated values whose successive derivatives become evanescent. It is particularly convenient when differences higher than the second are neglected. The formula then becomes

$$n = n_1 + n_1 [-r \omega a_0 + 2 (r \omega a_0)^2 - 5 (r \omega a_0)^3 + 14 (r \omega a_0)^4].$$

Since  $r \omega a_0$  is a very small quantity, the higher powers are seldom needed, and, should they be required, are easily taken into account. As an example, let it be required to find  $n$  when  $\log_{10} \sinh n = 7.48287$ . We compute

$$\begin{aligned} n_1 &= \frac{7.48287 - 7.47712}{1447.7} = 0.40 \\ r &= \frac{n_1}{2 \omega F'_0} = \frac{0.40}{2 \times 1447.7} = 0.0001; \end{aligned}$$

and

$$n_1 r \omega a_0 = 0.40 \times 0.0001 \times (-48.3) = 0.00.$$

Hence  $n = n_1 = 0.40$  and  $n = 0.00304$ , the same as obtained by the other method.

When  $F_n = e^n$ , it is easily shown, either by means of series (d) or by independent methods, that

$$\begin{aligned} n \omega &= \log (1 + n_1 \omega) \quad \dots \quad \dots \quad \dots \quad (e), \\ n &= + n_1 - 0.005 n_1^2 + 0.000,033 n_1^3 + \dots, \quad (\omega = 0.01) \\ n &= + n_1 - 0.0005 n_1^2 + \dots \quad (\omega = 0.001) \end{aligned}$$

These formulæ afford an easy means of finding the natural logarithm of a

<sup>1</sup> See, also, "Inverse Interpolation by Means of a Reversed Series," Phil. Mag., May, 1908.

number from the tabular values of  $e^{\pm u}$ . Thus, to find the natural logarithm of 0.9642102, we compute

$$u_1 = \frac{0.9646403 - 0.9642102}{0.0009646403} = 0.44587.$$

Substituting in the last of the above equations

$$u = 0.44587 - 0.0005 \times (0.45)^2 = 0.44577,$$

hence  $\text{nat log of } 0.9642102 = -0.0364458$ .

One of the most important applications of differences is the detection of errors in values tabulated at equal intervals of the argument. It may be shown by substitution in the schedule of differences (page xxxiv) that an error,  $+\epsilon$ , in  $F_0$  produces errors in the successive differences of any order which are multiples of  $\epsilon$ , the law of distribution of the multiples being that of the corresponding coefficients of the binomial theorem, and the signs of the errors being alternately positive and negative. Since some order of differences of every continuous function must vanish, the presence of an error in a tabular value must ultimately result in producing successive differences of a certain order which alternate in sign. A comparison of these differences with the corresponding binomial coefficients enables one to estimate the magnitude of the error. Thus in the series which follows:

$X$	$X^3$	$\Delta'$	$\Delta''$	$\Delta'''$	$\Delta^{(4)}$
13	2197				
14	2744	547			
		631	84		
15	3375		90	6	+ 2
		721		8	
16	4096		98		- 8
		819		0	
17	4915		98		+ 12
		917		12	
18	5832		110		- 8
		1027		4	
19	6859		114		+ 2
		1141		6	
20	8000		120		
		1261			
21	9261				

the alternation in sign occurs in the fourth-order differences, and the numerical values are twice the coefficients of  $(a+b)^4$ . Hence there is an error of  $+2$  units in the value 4915. The corrections  $-2, +8, -12, +8, -2$  applied to the fourth differences causes them to vanish, and the corrections  $-2, +6, -6, +2$  applied to the third differences reduces them to a constant. This method is particularly useful in detecting large accidental errors in a series of observed values and in estimating their magnitudes.

## DESCRIPTION OF TABLES.

Table I is devoted to 5-place values of the logarithmic hyperbolic sine, sine, tangent, and cotangent of  $x$  expressed in radians. The argument advances by ten-thousandths from 0 to 0.1, by thousandths from 0.1 to 0, and by hundredths from 3.0 to 6.0. In this as in all the tables (except table VII), instead of the first differences, the first derivatives of the functions multiplied by the tabular interval ( $m$ ) are tabulated in units of the last decimal place, under the heading  $mF'_0$ . As noted above, this agrees with much of the most authoritative modern practice and facilitates interpolation. It did not appear worth while to extend the tabulation of the table beyond 6 radians, because higher values are seldom needed; but in Table IV a few very high values of  $e^{\pm x}$  are given, from which in case of need the hyperbolic functions can be found.

In Table II the natural values of the hyperbolic functions are tabulated for the same arguments as in Table I. In some instances the values are given to one or to two places of decimals more than would be obtained by using the inverse logarithms of the preceding table.

Table III gives  $\sin x = -i \sinh ix$  and  $\cos x = \cosh ix$  with their logarithms to 5 decimal places, the argument  $x$  being expressed in radians. The tabulation extends from  $x = 0.0000$  to 0.1000, and from  $x = 0.100$  to  $\infty$ , because  $90^\circ = 1.5707963$  radians; so that, this value of  $\frac{\pi}{2}$  being in mind, the table affords the means of finding the sine or cosine of any  $x$  expressed in radians.

Independently of hyperbolic functions, this table is often convenient. It also facilitates the computation of the principal hyperbolic functions of complex variables. Thus

$$\sinh (u + iv) = \sinh u \cos v + i \cosh u \sin v,$$

$$\cosh (u + iv) = \cosh u \cos v + i \sinh u \sin v,$$

to compute either of these functions it is only needful to take out two related logarithms from Table III, two from Table I, make two additions, look out two antilogarithms. It is of course conceivable that all the quantities involved should be tabulated once for all; but even if  $u$  and  $v$  advanced only by hundredths, such a table would occupy 200 pages. To

from it functions corresponding to  $u$  and  $v$  expressed in thousandths would require three interpolations—a process quite as laborious as the use of the tables here given.

Space which would otherwise be vacant is utilized to give the angular measures of the radian arguments, or a table of conversion of radians from



0.0000 to 0.1000 and from 0.100 to 1.600 into degrees, minutes, seconds, and hundredths of a second.

Table IV gives the values of  $\log_{10} e^u$ ,  $e^u$  and  $e^{-u}$  to 7 decimal places from  $u = 0.000$  to 3.000 and from 3.00 to 6.00. The values of  $e^u$  and  $e^{-u}$  enter into a vast number of equations representing natural phenomena, especially those (as Cournot remarked) which can be classed under the generic denomination of phenomena of absorption or gradual extinction. The ascending and descending exponentials may be regarded at will either as hyperbolic functions or as independent components of hyperbolic functions, since

$$e^{\pm u} = \cosh u \pm \sinh u$$

while, on the other hand,

$$\sinh u = \frac{e^u - e^{-u}}{2}; \quad \cosh u = \frac{e^u + e^{-u}}{2};$$

$$\tanh u = \frac{e^u - e^{-u}}{e^u + e^{-u}}; \quad \text{gd } u = 2 \tan^{-1} e^u - \frac{\pi}{4}.$$

It is further evident that a table of  $e^{\pm u}$  is a table of natural antilogarithms. Formula *e* on page xli affords an easy means of obtaining the natural logarithm of a number from the tabular values of  $e^{\pm u}$ . It is of course unnecessary to give the derivative of  $e^u$ , since this is  $e^u$ , while the derivative  $e^{-u}$  is  $-e^{-u}$ . In general the interpolation or extrapolation of the function is very easy. (See formula *c*, page xxxix). The logarithm of  $e^{-u}$  is not given because, being merely the arithmetical complement of the  $\log_{10} e^u$ , it can be read off as fast as it can be written down.

In any table of  $\log_{10} e^u$  where the interval of  $u$  is  $\omega$ , the difference of successive logarithms is constant and equal to  $\omega \log_{10} e$  or 0.4342944819. If the logarithm of  $e^{u+\omega}$  is required, this will be

$$(u + \omega) \log_{10} e = \log_{10} e^u + \omega \log_{10} e.$$

Hence it is practicable to prepare an extended table of proportional parts or a table of  $\omega \log_{10} e$  which is applicable to any table of  $\log_{10} e^u$  when the tabulated values are multiplied by  $\omega$ . Such an auxiliary table is given at the

close of Table IV, in which the argument  $\frac{\omega}{m}$  varies from 0.000 to 0.500. If

$\omega$  is unity, this is merely a 5-place table of  $\log_{10} e^u$ . If, on the other hand,  $\omega$  is 0.001, as in the earlier part of Table IV, the auxiliary table gives the increments corresponding to  $u$  to 8 places of decimals. Thus, if  $\log_{10} e^{0.00000000}$  is required, Table IV gives  $\log_{10} e^{0.000} = 0.0382179$ , the auxiliary table gives for  $\frac{\omega}{m} = 0.245$ ,  $\omega \log_{10} e = 0.10640$ ; and since  $m = 0.001$ ,  $\omega n \log_{10} e = 0.00010640$ , which added to  $\log_{10} e^{0.000}$ , gives  $\log_{10} e^{0.000245} = 0.0383243$ . In the latter portion of Table IV  $\omega$  is only 0.01; so that, if the  $\log_{10} e^{1.0000000}$  is wanted, the main table gives  $\log e^{1.000} = 1.3028335$ , and  $\omega$  times  $\omega \log e$  is 0.0010640; so that the required number is 1.3039474.

When  $\log_{10} e^u$  is required for  $u > 6.00$  the auxiliary table is insufficient to give 7-place values. Then the main table, IV, may be used as an auxiliary table. Thus

$$\begin{aligned}\log e^{11.088216} &= \log e^{11} + \log e^{0.088216} \\ &= 4.7772393 + 0.0383243 = 4.8155636.\end{aligned}$$

In the second part of Table IV values of  $e^{+u}$  and the logarithms of  $e^u$  are given,  $u$  varying from 1 to 100. The logarithms are given to 10 decimals; the other functions to 9 significant figures. Such high values are seldom needed, but are included here lest these tables might some times fail the computer.

Table V gives the natural logarithms of numbers from 1 to 1000, with their derivatives to 5 places of decimals. These derivatives are merely the reciprocals of the arguments, and since  $\log_e \left( \frac{1}{x} \right) = -\log_e x$ , the logarithms

of the derivatives are the tabulated logarithms taken negatively. The table thus gives, in addition to the logarithms of 1000 whole numbers, the logarithms of 1000 proper fractions lying between 0.001 and unity.

The interpolation of natural logarithms is much less simple than is that of common logarithms, and this is the main reason why the latter are preferred for computation. A few simple rules, however, facilitate the needful calculations. When the natural logarithm of a vulgar fraction is required it is best to look out the logarithm of both numerator and denominator and subtract. If the natural logarithm is required of a fractional number stated decimally and less than 21.000, no attempt should be made to interpolate it directly, because the third differences of the table cannot be neglected for numbers so near the beginning of the table. If the number lies between 10.000 and 21.000, as, for example, 12.345, it should be written 123.45/10, and the required logarithm will be  $\text{nat log } 123.45 - \text{nat log } 10$ . It is safe to interpolate the first of these between  $\text{nat log } 123$  and  $\text{nat log } 124$ , using the formula for second differences. If the number whose logarithm is to be found lies between 1 and 10, as, for example, 8.2468, it should be written 824.68/100, so that the required quantity is  $\text{nat log } 824.68 - \text{nat log } 100$ . The first of these logarithms can be found by using only the mean first differences or the tabulated derivatives between the logarithms of 824 and 825. For values of the argument between 21 and 158 interpolation requires the use of second differences, while above 158 average first differences or the first derivative is sufficiently accurate, inasmuch as the error involved is less than half a unit in the fifth decimal place.

It would be possible to interpolate the negative logarithms of the smaller fractions given by the derivatives—that is, from the reciprocal of 159 on to the end of the table, or for numbers between 0.00628 and 0.00100—but this would not be expedient, because these reciprocals are themselves rounded values. If the natural logarithm of 0.0068352 is wanted as accurately as

the tables will give it, it is best to find the logarithm of 683.53 and to subtract from it the logarithm of 100,000. (See also formula *c*, page xli.)

The use of second differences may be avoided altogether if the computer chooses, for any number not lying between 158 and 1,000 may be multiplied and divided by another number which will bring the numerator within these limits. Thus, if, as before,  $\text{nat log } 12.345$  is required, this number may be written  $246\ 90/20$ , and the natural logarithm of the numerator found by help of the derivative, less  $\text{nat log } 20$ , is the required value.

The awkwardness of a table of natural logarithms is inherent and cannot be overcome by any device. It depends on the fact that *e* and the base of numeration, the number 10, are incommensurable quantities. If our numeration were duodecimal, as it might have been had six fingers to a hand been the rule instead of the exception, 12 would also have been the most convenient base for a table of logarithms. A great table of natural logarithms, such as Barlow's 8-place table of all numbers from 1 to 10,000, is only a little more convenient than that here offered, and with it, too, it is expedient to multiply any small number by a factor such that the product approaches 10,000.

Table VI gives the values of the gudermannian of *u* to 7 places from  $u = 0.000$  to  $u = 3.000$  and from  $u = 3.000$  to  $u = 6.000$ . In this table *u* is expressed in radians, and *gd u* both in radians and in angular measure. For theoretical work the gudermannian in radians is usually the more convenient, but for use in finding hyperbolic functions it must be reduced to an angle.

The gudermannian, *gd u*, is connected with the hyperbolic functions by the following well-known relations:

$$\sinh u = \tan gd\ u; \cosh u = \sec gd\ u; \tanh u = \sin gd\ u$$

$$\tanh \frac{u}{2} = \tan \frac{1}{2} gd\ u; u = \log_e \tan \left( \frac{\pi}{4} + \frac{1}{2} gd\ u \right).$$

Thus Table VI, with the help of a 7-place table of logarithms of the circular functions, gives 7-place values of the hyperbolic functions.

The derivative of *gd u* is  $\sec h\ u$ , and can be used independently of the gudermannian.

Table VII is substantially a reversion of Table VI, and gives the anti-gudermannian in terms of the gudermannian, both, however, being expressed in minutes and decimals of a minute. If *m* is the anti-gudermannian expressed in minutes and *u* the same function expressed in radians,

$$m = 3437.7468\ u = 3437.7468 \log_e \tan \left( \frac{\pi}{4} + \frac{1}{2} gd\ u \right).$$

Table VII is a table of *m*, and if *m* is multiplied by 0.000 2908 8821 the product is *u* in radians. This table is known to navigators as a table of Meridional Parts for a Spherical Globe. It is frequently of use in the discussion of physical questions and is the very foundation of navigation with Mercator charts. In the more modern works on navigation, however, the

ellipticity of the meridian is allowed for in computing tables of meridional parts, and consequently this table will probably never be reproduced in a navigator. For this reason it is here preserved for computers who are not engaged in navigation.

To test this table, which is borrowed from Inman, 200 of the values, or one in every 27 entries, were compared with Gudermann's 7-decimal place table of the antilogarithm in radian measure. In nearly all cases Inman's last figure was confirmed, but in a few instances the last figure is incorrect by a unit. Inquiry into these cases showed that the maximum error detected was less than 0.006 of a minute. Thus the last figure is not absolutely trustworthy, but is near enough to enable the computer to interpolate accurately to 5 places. If 7 places of the antilogarithm are required, they can be found by inverse interpolation in Table VI.

The earlier part of Table VII may be interpolated by first differences without considerable error. At about  $84^{\circ}30'$  one-eighth of the second difference becomes approximately half a unit in the last tabulated place, and beyond this point second differences should be taken into account.

Table VIII is a table for converting radians into angular measure and *vice versa*. A few numerical constants are appended.

## HISTORICAL NOTE.

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The first and most important application of the functions now known as hyperbolic was made by Gerhard Mercator (Kremer) when he issued his map on "Mercator's projection," in 1569, or, as some say, in 1550, while Bowditch gives the date as 1566. To this day substantially all of the deep-sea navigation of the world is carried on by the help of this projection, which has been modified only to the extent of correcting the "meridional parts" for the ellipticity of the meridian. Mercator's problem was to find a projection on which the loxodrome should be a straight line. The solution is unique, and for a spherical globe is  $\lambda = g d \frac{m}{a}$  where  $\lambda$  is the latitude,  $m$  the "meridional part," or the ordinate on the projection of a point in latitude  $\lambda$ , and  $a$  is the radius of the sphere. Of course, this relation gives

$$\frac{m}{a} = \log_e \tan \left( \frac{\pi}{4} + \frac{\lambda}{2} \right)$$

and this Mercator must have tabulated. He published his map without explanation, however, and it was left to Edward Wright in 1599 to state the formula for  $m$ .

"The actual inventor of the hyperbolic trigonometry," says Professor McMahon, "was Vincenzo Riccati, S. J. (*Opuscula ad res Phys. et Math. pertinens*, Bononiae, 1757). He adopted the notation *Sh.  $\phi$* , *Ch.  $\phi$* , for the hyperbolic functions and *Sc.  $\phi$* , *Cc.  $\phi$*  for the circular ones. He proved the addition theorem geometrically, and derived a construction for the solution of a cubic equation. Soon after Daviet de Foncenex showed how to interchange circular and hyperbolic functions by the use of  $\sqrt{-1}$ , and gave the analogue of de Moivre's theorem, the work resting more on analogy, however, than on clear definition (*Reflex. sur les quant. imag.*, Miscel. Turin Soc., Tom. 1). Johann Heinrich Lambert systematized the subject and gave the serial developments and the exponential expressions. He adopted the notation  $\sinh u$ , etc., and introduced the transcendent angle, now called the gudermannian, using it in computation and in the construction of tables<sup>1</sup>."

C. Gudermann published an important memoir on Potential or Cyclic-hyperbolic functions in 1830<sup>2</sup>, followed by extended tables. In recogni-

<sup>1</sup> James McMahon, *Hyperbolic Functions*, p. 71.

<sup>2</sup> Crelle's Journal, vols. 6, 7, 8, and 9. These memoirs were afterwards reprinted in a separate volume. xlviii

tion of his contributions to the subject, Cayley, in 1862,<sup>1</sup> proposed the name *gudermannian*<sup>2</sup> for the angle which Lambert called transcendental, and which had been variously designated by others. Among other more recent works on hyperbolic functions are Siegmund Günther's *Lehre von den Hyperbelfunctionen*, 1881, and Mr. James McMahon's *Hyperbolic Functions*, 4th edition, 1906.

The first large table of hyperbolic functions we have met with is Legendre's table of  $\log \tan \left( \frac{\pi}{4} + \frac{\lambda}{2} \right)$  to 12 decimals. The argument advances

by increments of 30 minutes, but five differences are tabulated to facilitate interpolation.<sup>3</sup> Gudermann in 1831 published a table of the same function, using centesimal degrees and advancing by hundredths of a degree ( $0^{\circ}0'32''.4$ ) from 0 to an entire quadrant, the function being given to seven decimal places. This was later supplemented by a table advancing by hundredths of a degree from  $88^{\circ}$  to  $100^{\circ}$ , the function being given to eleven decimal places. Gudermann also gave a 9-place table of  $\log \cosh u$ ,  $\log \sinh u$ , and  $\log \tanh u$ , from  $u = 2.000$  to  $u = 5.000$ , and a 10-place table of the same functions from  $u = 5.00$  to  $u = 12.00$ .

In 1862 Z. R. W. Gronau<sup>4</sup> published a 5-place table of hyperbolic functions, the argument being the gudermannian  $gd\ u$  in sexagesimal degrees and minutes. He tabulated to this argument  $\log \cosh u$ ,  $\log \sinh u$ , and the

Briggs logarithm of  $\left( \frac{\pi}{4} + \frac{gd\ u}{2} \right)$  instead of the natural logarithms of this function, following therein a suggestion of Lambert.

In 1890 W. Ljgowski issued his *Tafeln der Hyperbelfunctionen und der Kreisfunctionen*, which is admirably accurate and much the most useful collection of tables of the hyperbolic functions hitherto printed. He filled the gap left by Gudermann by computing  $\log \sinh u$ ,  $\log \cosh u$ , and  $\log \tanh u$  from  $u = 0.000$  to 2.000. These he gives to only 5 places, but in addition he tabulates  $gd\ u$  in degrees, minutes, seconds, and decimals of a second. These values are in all cases sufficiently accurate to enable the computer to take out from an ordinary table of logarithms 7-place values of the logarithms of  $\cosh u$ ,  $\sinh u$ , and  $\tanh u$ . The argument ranges from 0.000 to 2.000 and from 2.00 to 6.00 for  $gd\ u$ , while  $\log \cosh u$  and  $\log \sinh u$  are carried up to  $u = 9.00$ . Ljgowski also gives the natural functions  $\cosh u$ ,  $\sinh u$ ,  $\cos u$ , and  $\sin u$  to 6 decimals for values of  $u$  in radians from 0.00 to 2.00, the  $\cosh u$  and  $\sinh u$  being continued to  $u = 8.00$ . The only fault we can find with Ljgowski's tables is that the increments of the argument are sometimes inconveniently large.

<sup>1</sup> Phil. Mag., vol. 24, p. 19.

<sup>2</sup> Thus spelled in Cayley's paper.

<sup>3</sup> Exercices de Cal. Int., vol. 2, 1816.

<sup>4</sup> Neueste Schriften der Naturforscher-Gesellschaft in Danzig, vol. 6, 1862.

In 1883 F. W. Newman published a 12-place table<sup>1</sup> of the descending exponential from  $x = 0.000$  to  $x = 15.349$ , and a 11-place table of the same function advancing by two-thousandths from 15.350 to 17.298 and by five thousandths from 17.298 to 27.635. In the same volume appeared Mr. J. W. L. Glaisher's tables of the ascending and descending exponential to nine significant figures, with 10-place logarithms. The argument advances by one-thousandth to 0.1; by one-hundredth to 2.00; by one-tenth to 10, and by a single unit to 500.

Mr. A. Forti's *Nuove Tavole delle Funzioni Iperboliche* were published in 1892. The hyperbolic sines, cosines, and tangents, together with their logarithms, are given to six decimals from 0.0000 to 0.2000, from 0.200 to 2.000, and from 2.00 to 8.00. Frequent errors, however, of one, two, and three units in the last decimal place practically limit these tables to five places. The gudermannian is tabulated in degrees, minutes, seconds, and tenths of a second, and the logarithms of the arguments are given to seven places.

In the volume here presented the first thousand values of  $\log \sinh x$ ,  $\log \cosh x$ , and  $\log \tanh x$  have been computed; the remaining values have been taken from the tables of Gudermann or Ligowski. The values of the natural hyperbolic sines and cosines for values of the argument  $< 0.1$  and of the tangents for arguments  $> 2.0$  have been computed; the remaining values have been taken from the tables of Forti and Ligowski. A recomputation of a great number of the borrowed values was made in order to obtain the required accuracy. The values of  $\coth x$  and  $\log \coth x$  have been computed.

In Table III the sines and cosines were obtained by interpolation from the 7-place values of natural sines and cosines given in Hülse's *Vega*, where the argument is expressed in angle. The logarithms of the sines and cosines and the angular equivalents of the arguments have been computed.

In Table IV the values of  $e^{-x}$  are all taken from Newman's great table. Those of  $e^{+x}$  from 0.000 to 0.100 and from 1 to 100 are from Glaisher's table. The remainder we computed, checking the results by Glaisher's table or by reciprocating. It should be noted that the 7-place table of  $e^x$  given in Hülse's edition of *Vega* is inaccurate and really amounts to no more than a 5-place table. The logarithms of  $e^x$  were computed independently of the values of  $e^x$ .

Tables V and VIII are borrowed.

The values of  $gd\ x$  in Table VI in terms of angle are taken from Ligowski, excepting the thousand values between  $x = 2.000$  and 3.000. These were interpolated from Ligowski's values (2.00 to 3.00) with due checks on his accuracy. In preparing the table of  $gd\ x$  in radians it was necessary for us to make an independent computation of this function from  $x = 0.300$  to  $x = 3.000$  in order to secure accuracy in the seventh significant figure. The remaining values were derived from Ligowski by converting angles

<sup>1</sup> Cambridge Phil. Soc., Trans., vol. 13, 1883.

into radians. A considerable number of his values, however, were tested by independent computation.

Table VII is borrowed from the Nautical tables of James Inman, revised by James W. Inman, London, 1867, with a few small corrections.

Finally, it may be remarked that the derivatives as given in these tables have been computed for them. They are not derived from the differences of the values as printed, but from more extended values, or are computed independently, and the error of the derivatives as well as of the functions is less than one-half of a unit in the next succeeding decimal place.

These tables were prepared in connection with the geophysical work of the United States Geological Survey, and are published with the permission of the Director.

GEORGE D. BECKER,

C. E. VAN ORSTRAND.

WASHINGTON, D. C., *January, 1908.*





TABLE I

LOGARITHMS OF HYPERBOLIC FUNCTIONS

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.0000	— $\infty$	— $\infty$	0.00000	0.0	— $\infty$	— $\infty$	0
.0001	6.00000	43429.4	.00000	0.0	6.00000	43429.4	4.00000
.0002	.30103	21714.7	.00000		.30103	21714.7	3.00807
.0003	.47712	14476.5	.00000		.47712	14476.5	2.50588
.0004	.60206	10857.4	.00000		.60206	10857.4	2.00204
0.0005	6.60897	8685.9	0.00000	0.0	6.60897	8685.9	3.30404
.0006	.77815	7238.2	.00000		.77815	7238.2	2.80115
.0007	.84510	6204.2	.00000		.84510	6204.2	2.30000
.0008	.90309	5428.7	.00000		.90309	5428.7	1.99601
.0009	.95424	4825.5	.00000		.95424	4825.5	1.69570
0.0010	7.00000	4342.9	0.00000	0.0	7.00000	4342.9	3.00000
.0011	.04139	3948.1	.00000		.04139	3948.1	2.69801
.0012	.07918	3619.1	.00000		.07918	3619.1	2.39582
.0013	.11394	3340.7	.00000		.11394	3340.7	2.09300
.0014	.14613	3102.1	.00000		.14613	3102.1	1.78857
0.0015	7.17609	2895.3	0.00000	0.0	7.17609	2895.3	2.48401
.0016	.20112	2714.3	.00000		.20112	2714.3	2.08188
.0017	.23045	2554.7	.00000		.23045	2554.7	1.68038
.0018	.25527	2412.7	.00000		.25527	2412.7	1.27874
.0019	.27875	2285.8	.00000		.27875	2285.8	0.87633
0.0020	7.30103	2171.5	0.00000	0.0	7.30103	2171.5	2.60807
.0021	.32222	2008.1	.00000		.32222	2008.1	2.20778
.0022	.34242	1974.1	.00000		.34242	1974.1	1.80758
.0023	.36173	1888.2	.00000		.36173	1888.2	1.40817
.0024	.38021	1809.6	.00000		.38021	1809.6	1.00979
0.0025	7.39794	1737.2	0.00000	0.0	7.39794	1737.2	2.60006
.0026	.41497	1670.4	.00000		.41497	1670.4	2.20504
.0027	.43436	1608.5	.00000		.43436	1608.5	1.80401
.0028	.45216	1551.1	.00000		.45216	1551.1	1.40334
.0029	.46840	1497.6	.00000		.46840	1497.6	1.00200
0.0030	7.47712	1447.7	0.00000	0.0	7.47712	1447.7	2.60088
.0031	.49136	1401.0	.00000		.49136	1401.0	2.20804
.0032	.50515	1357.2	.00000		.50515	1357.2	1.80488
.0033	.51851	1316.0	.00000		.51851	1316.0	1.40149
.0034	.53148	1277.3	.00000		.53148	1277.3	1.00053
0.0035	7.54497	1240.8	0.00000	0.0	7.54497	1240.8	2.60304
.0036	.55630	1206.4	.00000		.55630	1206.4	2.20504
.0037	.56820	1173.8	.00000		.56820	1173.8	1.80180
.0038	.57978	1142.9	.00000		.57978	1142.9	1.40024
.0039	.59107	1113.6	.00000		.59107	1113.6	1.00001
0.0040	7.60206	1085.7	0.00000	0.0	7.60206	1085.7	2.60204
.0041	.61279	1059.3	.00000		.61279	1059.3	2.20224
.0042	.62325	1034.0	.00000		.62325	1034.0	1.80095
.0043	.63347	1010.0	.00000		.63347	1010.0	1.40053
.0044	.64345	987.0	.00000		.64345	987.0	1.00055
0.0045	7.65321	965.1	0.00000	0.0	7.65321	965.1	2.60400
.0046	.66276	944.1	.00000		.66276	944.1	2.20245
.0047	.67210	924.0	.00000		.67210	924.0	1.80201
.0048	.68124	904.8	.00001		.68124	904.8	1.40176
.0049	.69020	886.3	.00001		.69020	886.3	1.00281
0.0050	7.69897	868.6	0.00001	0.0	7.69897	868.6	2.60104
u	log tanh u	$\omega F_u'$	log coth u	$\omega F_u'$	log sinh u	$\omega F_u'$	log cosh u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.0050	7.60897	855.6	0.00001	0.0	7.60897	855.6	2.30103
.0051	.70757	851.0	.00001		.70757	851.5	.29943
.0052	.71001	845.2	.00001		.71000	845.2	.298400
.0053	.72128	810.4	.00001		.72127	810.4	.29753
.0054	.73240	804.3	.00001		.73239	804.2	.29701
0.0055	7.74040	789.0	0.00001	0.0	7.74040	789.0	2.29661
.0056	.74809	775.5	.00001		.74818	775.5	.29583
.0057	.75538	761.0	.00001		.75587	761.0	.29414
.0058	.76313	748.8	.00001		.76312	748.8	.29358
.0059	.77085	736.1	.00001		.77085	736.1	.29315
0.0060	7.77815	723.8	0.00001	0.0	7.77815	723.8	2.29285
.0061	.78533	712.0	.00001		.78532	711.9	.29168
.0062	.79240	700.5	.00001		.79239	700.5	.29070
.0063	.79944	689.4	.00001		.79943	689.4	.29007
.0064	.80648	678.6	.00001		.80647	678.6	.28984
0.0065	7.81392	668.1	0.00001	0.0	7.81391	668.1	2.28909
.0066	.81095	658.0	.00001		.81094	658.0	.28840
.0067	.81798	648.2	.00001		.81797	648.2	.28793
.0068	.82491	638.7	.00001		.82490	638.6	.28750
.0069	.83185	629.4	.00001		.83184	629.4	.28716
0.0070	7.83910	620.1	0.00001	0.0	7.83910	620.1	2.28591
.0071	.83613	611.7	.00001		.83612	611.7	.28475
.0072	.84316	603.2	.00001		.84315	603.2	.28368
.0073	.85019	594.9	.00001		.85018	594.9	.28268
.0074	.85722	586.9	.00001		.85721	586.9	.28178
0.0075	7.86450	579.1	0.00001	0.0	7.86450	579.0	2.28105
.0076	.86153	571.4	.00001		.86152	571.4	.28019
.0077	.86856	564.0	.00001		.86855	564.0	.27952
.0078	.87559	556.8	.00001		.87558	556.8	.27901
.0079	.88262	549.7	.00001		.88261	549.7	.27838
0.0080	7.88998	542.8	0.00001	0.0	7.88998	542.8	2.27792
.0081	.88701	536.4	.00001		.88700	536.4	.27715
.0082	.89404	530.0	.00001		.89403	530.0	.27620
.0083	.90107	523.6	.00001		.90106	523.6	.27503
.0084	.90810	517.0	.00001		.90809	517.0	.27373
0.0085	7.91542	510.9	0.00002	0.0	7.91541	510.9	2.27309
.0086	.91245	505.0	.00002		.91244	505.0	.27251
.0087	.91948	499.4	.00002		.91947	499.4	.27190
.0088	.92651	493.5	.00002		.92650	493.5	.27153
.0089	.93354	488.0	.00002		.93353	487.9	.27062
0.0090	7.94093	482.6	0.00002	0.0	7.94093	482.5	2.27077
.0091	.93796	477.3	.00002		.93795	477.3	.27007
.0092	.94499	472.1	.00002		.94498	472.0	.26942
.0093	.95202	467.0	.00002		.95201	467.0	.26853
.0094	.95905	462.0	.00002		.95904	462.0	.26788
0.0095	7.96737	457.2	0.00002	0.0	7.96737	457.1	2.26720
.0096	.96440	452.1	.00002		.96439	452.1	.26674
.0097	.97143	447.7	.00002		.97142	447.7	.26621
.0098	.97846	443.2	.00002		.97845	443.1	.26570
.0099	.98549	438.7	.00002		.98548	438.7	.26518
0.0100	8.00000	434.3	0.00002	0.0	7.99999	434.3	2.00001
u	log tanh u	$\omega F_u'$	log coth u	$\omega F_u'$	log sinh u	$\omega F_u'$	log cosh u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0100	8.00001	434.3	0.00002	0.0	7.99999	434.3	7.00001
.0101	.00133	439.0	.00002		8.00134	439.0	7.00250
.0102	.00251	425.8	.00002		.00250	425.7	.00111
.0103	.00431	421.7	.00002		.00433	421.6	.00213
.0104	.00701	417.6	.00002		.00702	417.6	.00398
0.0105	8.02120	413.6	0.00002	0.0	8.02117	413.6	7.02115
.0106	.02531	409.7	.00002		.02530	409.7	.02171
.0107	.02939	405.9	.00002		.02937	405.9	.02303
.0108	.03343	402.1	.00003		.03341	402.1	.02650
.0109	.03741	398.5	.00003		.03741	398.4	.02950
0.0110	8.04140	394.8	0.00003	0.0	8.04138	394.8	7.04136
.0111	.04533	391.3	.00003		.04531	391.3	.04190
.0112	.04923	387.8	.00003		.04920	387.7	.04348
.0113	.05309	384.1	.00003		.05306	384.1	.04501
.0114	.05691	381.0	.00003		.05689	381.0	.04640
0.0115	8.05671	377.7	0.00003	0.0	8.05668	377.6	7.05666
.0116	.05447	374.1	.00003	0.1	.05444	374.1	.05396
.0117	.05830	371.2	.00003		.05827	371.2	.05443
.0118	.06218	368.1	.00003		.06216	368.0	.05511
.0119	.06556	365.0	.00003		.06553	365.0	.05642
0.0120	8.07919	361.0	0.00003	0.1	8.07916	361.0	7.07914
.0121	.06880	358.0	.00003		.06876	358.0	.06724
.0122	.06837	355.0	.00003		.06834	355.0	.06860
.0123	.06992	353.1	.00003		.06988	353.0	.06911
.0124	.07343	350.3	.00003		.07340	350.2	.07060
0.0125	8.09602	347.5	0.00003	0.1	8.09600	347.4	7.09601
.0126	.10038	344.7	.00003		.10035	344.6	.10096
.0127	.10382	342.0	.00004		.10378	341.9	.10253
.0128	.10722	339.3	.00004		.10719	339.3	.10411
.0129	.11060	336.7	.00004		.11057	336.6	.10564
0.0130	8.11396	334.1	0.00004	0.1	8.11393	334.0	7.11396
.0131	.11728	331.5	.00004		.11725	331.5	.11475
.0132	.12050	329.0	.00004		.12045	329.0	.11613
.0133	.12385	326.6	.00004		.12383	326.5	.11762
.0134	.12712	324.1	.00004		.12708	324.1	.11910
0.0135	8.13035	321.7	0.00004	0.1	8.13031	321.6	7.13035
.0136	.13355	319.1	.00004		.13351	319.1	.13190
.0137	.13673	317.0	.00004		.13669	317.0	.13341
.0138	.13989	314.7	.00004		.13985	314.7	.13495
.0139	.14303	312.5	.00004		.14299	312.4	.13651
0.0140	8.14614	310.2	0.00004	0.1	8.14610	310.1	7.14610
.0141	.14923	308.0	.00004		.14919	308.0	.14761
.0142	.15230	305.9	.00004		.15226	305.8	.14924
.0143	.15535	303.7	.00004		.15531	303.7	.15090
.0144	.15838	301.6	.00005		.15833	301.6	.15257
0.0145	8.16138	299.5	0.00005	0.1	8.16134	299.4	7.16138
.0146	.16137	297.5	.00005		.16134	297.4	.16303
.0147	.16733	295.5	.00005		.16729	295.4	.16471
.0148	.17028	293.5	.00005		.17023	293.4	.16642
.0149	.17320	291.5	.00005		.17315	291.4	.16815
0.0150	8.17611	289.6	0.00005	0.1	8.17606	289.5	7.17611
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.0150	8.17611	289.6	0.00005	0.1	8.17606	289.5	1.82301
.0151	.17809	289.6	.00005		.17804	289.6	.82100
.0152	.18183	289.7	.00005		.18181	289.7	.81909
.0153	.18471	289.8	.00005		.18466	289.8	.81734
.0154	.18754	289.9	.00005		.18749	289.9	.81551
0.0155	8.19035	289.9	0.00005	0.1	8.19030	289.9	1.80970
.0156	.19304	278.4	.00005		.19300	278.3	.80801
.0157	.19592	279.0	.00005		.19586	279.0	.80614
.0158	.19883	279.6	.00005		.19876	279.6	.80438
.0159	.20142	279.6	.00005		.20136	279.6	.79884
0.0160	8.20414	271.5	0.00005	0.1	8.20408	271.4	1.79502
.0161	.20684	269.8	.00005		.20679	269.7	.79321
.0162	.20953	268.1	.00005		.20948	268.0	.79152
.0163	.21221	266.5	.00005		.21215	266.4	.78985
.0164	.21480	264.8	.00005		.21476	264.8	.78820
0.0165	8.21750	263.2	0.00005	0.1	8.21744	263.1	1.78256
.0166	.22013	261.6	.00005		.22007	261.6	.77993
.0167	.22272	260.1	.00005		.22268	260.0	.77732
.0168	.22533	258.5	.00005		.22527	258.5	.77473
.0169	.22791	257.0	.00005		.22785	257.0	.77215
0.0170	8.23042	255.5	0.00005	0.1	8.23041	255.4	1.76959
.0171	.23302	254.0	.00005		.23295	253.9	.76795
.0172	.23555	252.5	.00005		.23549	252.4	.76631
.0173	.23807	251.1	.00005		.23800	251.0	.76460
.0174	.24057	249.6	.00007		.24051	249.5	.76290
0.0175	8.24305	248.2	0.00007	0.1	8.24299	248.1	1.75701
.0176	.24554	246.8	.00007		.24547	246.7	.75533
.0177	.24800	245.4	.00007		.24793	245.3	.75367
.0178	.25044	244.0	.00007		.25037	243.9	.75203
.0179	.25288	242.6	.00007		.25281	242.6	.75040
0.0180	8.25530	241.3	0.00007	0.1	8.25523	241.2	1.74477
.0181	.25770	240.0	.00007		.25763	240.0	.74317
.0182	.26010	238.6	.00007		.26002	238.6	.74158
.0183	.26248	237.3	.00007		.26240	237.3	.73990
.0184	.26484	236.1	.00007		.26477	236.0	.73823
0.0185	8.26720	234.8	0.00007	0.1	8.26712	234.7	1.73288
.0186	.26951	233.5	.00008		.26946	233.4	.73134
.0187	.27187	232.3	.00008		.27179	232.2	.72981
.0188	.27418	231.0	.00008		.27411	231.0	.72829
.0189	.27649	229.8	.00008		.27641	229.7	.72679
0.0190	8.27878	228.6	0.00008	0.1	8.27870	228.5	1.72130
.0191	.28106	227.4	.00008		.28098	227.3	.71982
.0192	.28333	226.2	.00008		.28325	226.1	.71835
.0193	.28558	225.1	.00008		.28550	225.0	.71690
.0194	.28783	223.9	.00008		.28775	223.8	.71545
0.0195	8.29006	222.7	0.00008	0.1	8.29008	222.7	1.71002
.0196	.29238	221.6	.00008		.29230	221.5	.70860
.0197	.29449	220.5	.00008		.29441	220.4	.70715
.0198	.29660	219.4	.00009		.29661	219.3	.70570
.0199	.29888	218.3	.00009		.29880	218.2	.70420
0.0200	8.30106	217.2	0.00009	0.1	8.30097	217.1	1.69803
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0200	8.30106	217.2	0.00009	0.1	8.30007	217.1	1.60003
.0201	.30323	216.1	.00009		.30311	216.0	.60086
.0202	.30538	215.0	.00009		.30520	214.9	.60171
.0203	.30753	214.0	.00009		.30741	213.9	.60256
.0204	.30966	212.9	.00009		.30957	212.8	.60343
0.0205	8.31178	211.9	0.00009	0.1	8.31160	211.8	1.60831
.0206	.31390	210.9	.00009		.31381	210.8	.60919
.0207	.31600	209.8	.00009		.31591	209.7	.61000
.0208	.31809	208.8	.00009		.31800	208.7	.61080
.0209	.32018	207.8	.00009		.32008	207.7	.61162
0.0210	8.32225	206.8	0.00010	0.1	8.32216	206.7	1.61778
.0211	.32431	205.9	.00010		.32422	205.8	.61858
.0212	.32637	204.9	.00010		.32627	204.8	.61937
.0213	.32841	203.9	.00010		.32831	203.8	.62019
.0214	.33045	203.0	.00010		.33035	202.9	.62095
0.0215	8.33247	202.0	0.00010	0.1	8.33237	201.9	1.62763
.0216	.33449	201.1	.00010		.33439	201.0	.62841
.0217	.33649	200.2	.00010		.33639	200.1	.62916
.0218	.33849	199.2	.00010		.33839	199.2	.62991
.0219	.34048	198.3	.00010		.34037	198.2	.63063
0.0220	8.34246	197.4	0.00011	0.1	8.34235	197.3	1.63765
.0221	.34443	196.5	.00011		.34432	196.4	.63840
.0222	.34639	195.7	.00011		.34628	195.6	.63912
.0223	.34834	194.8	.00011		.34823	194.7	.63982
.0224	.35028	193.9	.00011		.35018	193.8	.64052
0.0225	8.35222	193.1	0.00011	0.1	8.35211	193.0	1.64789
.0226	.35415	192.2	.00011		.35403	192.1	.64859
.0227	.35606	191.4	.00011		.35595	191.3	.64925
.0228	.35797	190.5	.00011		.35786	190.4	.64991
.0229	.35987	189.7	.00011		.35976	189.6	.65054
0.0230	8.36177	188.9	0.00011	0.1	8.36165	188.8	1.65835
.0231	.36365	188.0	.00012		.36353	187.9	.65907
.0232	.36553	187.2	.00012		.36541	187.1	.65975
.0233	.36740	186.4	.00012		.36728	186.3	.66042
.0234	.36926	185.6	.00012		.36914	185.5	.66108
0.0235	8.37111	184.8	0.00012	0.1	8.37099	184.7	1.66901
.0236	.37295	184.1	.00012		.37283	184.0	.66971
.0237	.37479	183.3	.00012		.37467	183.2	.67038
.0238	.37662	182.5	.00012		.37649	182.4	.67105
.0239	.37844	181.7	.00012		.37832	181.6	.67171
0.0240	8.38025	181.0	0.00013	0.1	8.38013	180.9	1.67987
.0241	.38206	180.2	.00013		.38193	180.1	.68057
.0242	.38386	179.5	.00013		.38373	179.4	.68127
.0243	.38565	178.8	.00013		.38552	178.7	.68198
.0244	.38743	178.0	.00013		.38730	177.9	.68267
0.0245	8.38921	177.3	0.00013	0.1	8.38908	177.2	1.69092
.0246	.39098	176.6	.00013		.39085	176.5	.69165
.0247	.39274	175.9	.00013		.39261	175.8	.69239
.0248	.39450	175.2	.00013		.39436	175.0	.69311
.0249	.39624	174.5	.00013		.39611	174.3	.69389
0.0250	8.39799	173.8	0.00014	0.1	8.39785	173.6	1.69215
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.0250	8.39290	173.8	0.00014	0.1	8.39285	173.6	1.60215
0.0251	8.39292	173.8	0.00014		8.39288	173.6	1.60042
0.0252	8.39294	173.8	0.00014		8.39291	173.6	1.59869
0.0253	8.39297	173.8	0.00014		8.39294	173.6	1.59697
0.0254	8.39299	173.8	0.00014		8.39297	173.6	1.59526
0.0255	8.39301	173.8	0.00014	0.1	8.39300	173.2	1.59355
0.0256	8.39303	173.8	0.00014		8.39302	173.6	1.59185
0.0257	8.39305	173.8	0.00014		8.39304	173.6	1.59016
0.0258	8.39307	173.8	0.00014		8.39306	173.6	1.58848
0.0259	8.39309	173.8	0.00015		8.39308	173.6	1.58680
0.0260	8.39311	173.8	0.00015	0.1	8.39310	173.0	1.58512
0.0261	8.39313	173.8	0.00015		8.39312	173.6	1.58346
0.0262	8.39315	173.8	0.00015		8.39314	173.6	1.58180
0.0263	8.39317	173.8	0.00015		8.39316	173.6	1.58014
0.0264	8.39319	173.8	0.00015		8.39318	173.6	1.57850
0.0265	8.39321	173.8	0.00015	0.1	8.39320	173.8	1.57686
0.0266	8.39323	173.8	0.00015		8.39322	173.8	1.57522
0.0267	8.39325	173.8	0.00015		8.39324	173.8	1.57359
0.0268	8.39327	173.8	0.00016		8.39326	173.8	1.57197
0.0269	8.39329	173.8	0.00016		8.39328	173.8	1.57035
0.0270	8.39331	173.8	0.00016	0.1	8.39330	173.8	1.56874
0.0271	8.39333	173.8	0.00016		8.39332	173.8	1.56714
0.0272	8.39335	173.8	0.00016		8.39334	173.8	1.56554
0.0273	8.39337	173.8	0.00016		8.39336	173.8	1.56395
0.0274	8.39339	173.8	0.00016		8.39338	173.8	1.56236
0.0275	8.39341	173.8	0.00016	0.1	8.39340	173.8	1.56078
0.0276	8.39343	173.8	0.00017		8.39342	173.8	1.55920
0.0277	8.39345	173.8	0.00017		8.39344	173.8	1.55763
0.0278	8.39347	173.8	0.00017		8.39346	173.8	1.55607
0.0279	8.39349	173.8	0.00017		8.39348	173.8	1.55451
0.0280	8.39351	173.8	0.00017	0.1	8.39350	173.8	1.55296
0.0281	8.39353	173.8	0.00017		8.39352	173.8	1.55141
0.0282	8.39355	173.8	0.00017		8.39354	173.8	1.54987
0.0283	8.39357	173.8	0.00017		8.39356	173.8	1.54833
0.0284	8.39359	173.8	0.00018		8.39358	173.8	1.54680
0.0285	8.39361	173.8	0.00018	0.1	8.39360	173.8	1.54527
0.0286	8.39363	173.8	0.00018		8.39362	173.8	1.54375
0.0287	8.39365	173.8	0.00018		8.39364	173.8	1.54221
0.0288	8.39367	173.8	0.00018		8.39366	173.8	1.54073
0.0289	8.39369	173.8	0.00018		8.39368	173.8	1.53922
0.0290	8.39371	173.8	0.00018	0.1	8.39370	173.8	1.53772
0.0291	8.39373	173.8	0.00018		8.39372	173.8	1.53623
0.0292	8.39375	173.8	0.00019		8.39374	173.8	1.53474
0.0293	8.39377	173.8	0.00019		8.39376	173.8	1.53326
0.0294	8.39379	173.8	0.00019		8.39378	173.8	1.53178
0.0295	8.39381	173.8	0.00019	0.1	8.39380	173.8	1.53030
0.0296	8.39383	173.8	0.00019		8.39382	173.8	1.52884
0.0297	8.39385	173.8	0.00019		8.39384	173.8	1.52737
0.0298	8.39387	173.8	0.00019		8.39386	173.8	1.52591
0.0299	8.39389	173.8	0.00019		8.39388	173.8	1.52446
0.0300	8.39391	173.8	0.00020	0.1	8.39390	173.8	1.52301
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$



Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0300	8.47719	144.8	0.00020	0,1	8.47699	144.7	1.52301
.0301	.47863	144.3	.00020		.47844	144.2	.52156
.0302	.48007	143.8	.00020		.47987	143.7	.52013
.0303	.48151	143.4	.00020		.48131	143.2	.51869
.0304	.48294	142.9	.00020		.48274	142.8	.51726
0.0305	8.48437	142.4	0.00020	0,1	8.48417	142.3	1.51583
.0306	.48579	142.0	.00020		.48559	141.8	.51441
.0307	.48721	141.5	.00020		.48700	141.4	.51300
.0308	.48862	141.0	.00021		.48841	140.9	.51159
.0309	.49003	140.6	.00021		.48982	140.5	.51018
0.0310	8.49143	140.1	0.00021	0,1	8.49122	140.0	1.50878
.0311	.49283	139.7	.00021		.49262	139.6	.50738
.0312	.49423	139.2	.00021		.49401	139.1	.50599
.0313	.49562	138.8	.00021		.49540	138.7	.50460
.0314	.49700	138.4	.00021		.49679	138.2	.50321
0.0315	8.49838	137.9	0.00022	0,1	8.49817	137.8	1.50183
.0316	.49976	137.5	.00022		.49954	137.3	.50046
.0317	.50113	137.0	.00022		.50091	136.9	.49909
.0318	.50250	136.6	.00022		.50228	136.5	.49772
.0319	.50385	136.2	.00022		.50364	136.1	.49636
0.0320	8.50522	135.8	0.00022	0,1	8.50500	135.6	1.49500
.0321	.50658	135.3	.00022		.50636	135.2	.49364
.0322	.50793	134.9	.00023		.50771	134.8	.49229
.0323	.50928	134.5	.00023		.50905	134.4	.49095
.0324	.51062	134.1	.00023		.51039	133.9	.48961
0.0325	8.51196	133.7	0.00023	0,1	8.51173	133.5	1.48827
.0326	.51329	133.3	.00023		.51306	133.1	.48694
.0327	.51463	132.9	.00023		.51439	132.7	.48561
.0328	.51595	132.5	.00023		.51572	132.3	.48428
.0329	.51727	132.1	.00023		.51704	131.9	.48296
0.0330	8.51859	131.7	0.00024	0,1	8.51836	131.5	1.48164
.0331	.51991	131.3	.00024		.51967	131.1	.48033
.0332	.52122	130.9	.00024		.52098	130.7	.47902
.0333	.52252	130.5	.00024		.52228	130.3	.47772
.0334	.52383	130.1	.00024		.52358	129.9	.47642
0.0335	8.52513	129.7	0.00024	0,1	8.52488	129.5	1.47512
.0336	.52642	129.3	.00025		.52618	129.2	.47382
.0337	.52771	128.9	.00025		.52747	128.8	.47253
.0338	.52900	128.5	.00025		.52875	128.4	.47125
.0339	.53028	128.2	.00025		.53003	128.0	.46997
0.0340	8.53156	127.8	0.00025	0,1	8.53131	127.6	1.46869
.0341	.53284	127.4	.00025		.53259	127.3	.46741
.0342	.53411	127.0	.00025		.53386	126.9	.46614
.0343	.53538	126.7	.00026		.53512	126.5	.46488
.0344	.53664	126.3	.00026		.53639	126.1	.46361
0.0345	8.53791	125.9	0.00026	0,1	8.53765	125.8	1.46235
.0346	.53916	125.6	.00026	0,2	.53890	125.4	.46110
.0347	.54042	125.2	.00026		.54016	125.1	.45984
.0348	.54167	124.8	.00026		.54140	124.7	.45860
.0349	.54291	124.5	.00026		.54265	124.3	.45735
0.0350	8.54416	124.1	0.00027	0,2	8.54389	124.0	1.45611
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.0350	8.54416	124.1	0.00027	0.2	8.54389	124.0	1.45611
0.0351	545.10	124.8	.00027		.54513	123.6	.45487
0.0352	546.3	124.4	.00027		.54636	123.3	.45364
0.0353	547.83	124.1	.00027		.54750	123.0	.45241
0.0354	549.09	123.7	.00027		.54882	122.6	.45118
0.0355	8.55032	123.4	0.00027	0.2	8.55005	122.2	1.44995
0.0356	551.51	123.0	.00028		.55127	121.9	.44873
0.0357	552.70	121.7	.00028		.55248	121.5	.44752
0.0358	553.98	121.4	.00028		.55370	121.2	.44630
0.0359	555.19	121.0	.00028		.55491	120.9	.44509
0.0360	8.55640	120.7	0.00028	0.2	8.55611	120.5	1.44389
0.0361	557.60	120.4	.00028		.55732	120.2	.44268
0.0362	558.80	120.0	.00028		.55852	119.9	.44148
0.0363	560.00	119.7	.00029		.55972	119.5	.44028
0.0364	561.20	119.4	.00029		.56091	119.2	.43909
0.0365	8.56239	119.0	0.00029	0.2	8.56210	118.9	1.43790
0.0366	563.58	118.7	.00029		.56329	118.6	.43671
0.0367	564.70	118.4	.00029		.56447	118.3	.43553
0.0368	565.95	118.1	.00029		.56565	117.9	.43435
0.0369	567.12	117.7	.00030		.56683	117.6	.43317
0.0370	8.56830	117.4	0.00030	0.2	8.56800	117.3	1.43200
0.0371	569.17	117.1	.00030		.56917	117.0	.43083
0.0372	570.64	116.8	.00030		.57034	116.6	.42966
0.0373	571.81	116.5	.00030		.57151	116.3	.42849
0.0374	572.97	116.2	.00030		.57267	116.0	.42733
0.0375	8.57413	115.9	0.00031	0.2	8.57383	115.7	1.42617
0.0376	575.29	115.6	.00031		.57498	115.4	.42502
0.0377	576.14	115.3	.00031		.57614	115.1	.42386
0.0378	577.60	114.9	.00031		.57729	114.8	.42271
0.0379	578.74	114.6	.00031		.57843	114.5	.42157
0.0380	8.57980	114.3	0.00031	0.2	8.57957	114.2	1.42043
0.0381	581.03	114.0	.00032		.58071	113.9	.41929
0.0382	582.17	113.7	.00032		.58185	113.6	.41815
0.0383	583.30	113.4	.00032		.58299	113.3	.41701
0.0384	584.44	113.2	.00032		.58412	113.0	.41588
0.0385	8.58657	112.9	0.00032	0.2	8.58625	112.7	1.41475
0.0386	586.70	112.6	.00032		.58637	112.4	.41363
0.0387	587.82	112.3	.00033		.58750	112.1	.41251
0.0388	588.94	112.0	.00033		.58861	111.8	.41139
0.0389	590.06	111.7	.00033		.58973	111.5	.41027
0.0390	8.59117	111.4	0.00033	0.2	8.59081	111.2	1.40916
0.0391	592.29	111.1	.00033		.59196	111.0	.40804
0.0392	593.40	110.8	.00033		.59306	110.7	.40692
0.0393	594.50	110.6	.00034		.59417	110.4	.40583
0.0394	595.61	110.3	.00034		.59527	110.1	.40473
0.0395	8.59671	110.0	0.00034	0.2	8.59637	109.8	1.40363
0.0396	597.81	109.7	.00034		.59747	109.6	.40253
0.0397	598.90	109.5	.00034		.59856	109.3	.40144
0.0398	600.00	109.2	.00034		.59965	109.0	.40035
0.0399	601.09	108.9	.00035		.60074	108.7	.39926
0.0400	8.60218	108.6	0.00035	0.2	8.60183	108.5	1.39817
u	log tanh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log sinh u	$\omega F_u'$	log coth u

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0100	8.60218	108.6	0.00035	0.2	8.60183	108.5	1.39817
.0101	.60326	108.4	.00035		.60291	108.2	.39709
.0102	.60434	108.1	.00035		.60399	107.9	.39601
.0103	.60542	107.8	.00035		.60507	107.6	.39493
.0104	.60650	107.6	.00035		.60615	107.4	.39385
0.0105	8.60757	107.3	0.00036	0.2	8.60722	107.1	1.39278
.0106	.60865	107.0	.00036		.60829	106.9	.39171
.0107	.60971	106.8	.00036		.60935	106.6	.39065
.0108	.61078	106.5	.00036		.61042	106.3	.38958
.0109	.61184	106.2	.00036		.61148	106.1	.38852
0.0110	8.61291	105.9	0.00036	0.2	8.61254	105.8	1.38746
.0111	.61396	105.7	.00037		.61360	105.5	.38640
.0112	.61502	105.5	.00037		.61465	105.3	.38535
.0113	.61607	105.2	.00037		.61570	105.0	.38430
.0114	.61712	105.0	.00037		.61675	104.8	.38325
0.0115	8.61817	104.7	0.00037	0.2	8.61780	104.5	1.38220
.0116	.61922	104.5	.00038		.61884	104.3	.38116
.0117	.62026	104.2	.00038		.61988	104.0	.38012
.0118	.62130	104.0	.00038		.62092	103.8	.37908
.0119	.62234	103.7	.00038		.62196	103.5	.37804
0.0120	8.62338	103.5	0.00038	0.2	8.62299	103.3	1.37701
.0121	.62441	103.2	.00038		.62403	103.0	.37597
.0122	.62544	103.0	.00039		.62505	102.8	.37495
.0123	.62647	102.7	.00039		.62608	102.5	.37392
.0124	.62750	102.5	.00039		.62711	102.3	.37289
0.0125	8.62852	102.2	0.00039	0.2	8.62813	102.1	1.37187
.0126	.62954	102.0	.00039		.62915	101.8	.37085
.0127	.63056	101.8	.00040		.63016	101.6	.36984
.0128	.63158	101.5	.00040		.63118	101.3	.36882
.0129	.63259	101.3	.00040		.63219	101.1	.36781
0.0130	8.63360	101.1	0.00040	0.2	8.63320	100.9	1.36680
.0131	.63461	100.8	.00040		.63421	100.6	.36579
.0132	.63562	100.6	.00041		.63521	100.4	.36479
.0133	.63662	100.4	.00041		.63622	100.2	.36378
.0134	.63763	100.1	.00041		.63722	99.9	.36278
0.0135	8.63863	99.9	0.00041	0.2	8.63822	99.7	1.36178
.0136	.63962	99.7	.00041		.63921	99.5	.36079
.0137	.64062	99.4	.00041		.64020	99.3	.35980
.0138	.64161	99.2	.00042		.64120	99.0	.35880
.0139	.64260	99.0	.00042		.64219	98.8	.35781
0.0140	8.64359	98.8	0.00042	0.2	8.64317	98.6	1.35683
.0141	.64458	98.5	.00042		.64416	98.4	.35584
.0142	.64556	98.3	.00042		.64514	98.1	.35486
.0143	.64655	98.1	.00043		.64612	97.9	.35388
.0144	.64753	97.9	.00043		.64710	97.7	.35290
0.0145	8.64850	97.7	0.00043	0.2	8.64807	97.5	1.35193
.0146	.64948	97.4	.00043		.64905	97.2	.35095
.0147	.65045	97.2	.00043		.65002	97.0	.34998
.0148	.65142	97.0	.00044		.65099	96.8	.34901
.0149	.65239	96.8	.00044		.65195	96.6	.34805
0.0150	8.65336	96.6	0.00044	0.2	8.65292	96.4	1.34708
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

SMITHSONIAN TABLE

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
0.0150	8.65330	96.6	0.00044	0.2	8.65202	96.4	1.34708
.0151	.65432	96.4	.00044		.65383	96.2	.34612
.0152	.65530	96.1	.00044		.65481	96.0	.34516
.0153	.65625	95.9	.00045		.65580	95.7	.34420
.0154	.65721	95.7	.00045		.65676	95.5	.34324
0.0155	8.65816	95.5	0.00045	0.2	8.65771	95.3	1.34229
.0156	.65912	95.3	.00045		.65866	95.1	.34134
.0157	.66007	95.1	.00045		.65961	94.9	.34039
.0158	.66102	94.9	.00046		.66056	94.7	.33944
.0159	.66197	94.7	.00046		.66151	94.5	.33849
0.0160	8.66291	94.5	0.00046	0.2	8.66245	94.3	1.33755
.0161	.66385	94.3	.00046		.66339	94.1	.33661
.0162	.66480	94.1	.00046		.66433	93.9	.33567
.0163	.66574	93.9	.00047		.66527	93.7	.33473
.0164	.66669	93.7	.00047		.66621	93.5	.33379
0.0165	8.66761	93.5	0.00047	0.2	8.66714	93.3	1.33286
.0166	.66854	93.3	.00047		.66807	93.1	.33193
.0167	.66947	93.1	.00047		.66900	92.9	.33100
.0168	.67040	92.9	.00048		.67003	92.7	.33007
.0169	.67133	92.7	.00048		.67085	92.5	.32915
0.0170	8.67226	92.5	0.00048	0.2	8.67178	92.3	1.32822
.0171	.67318	92.3	.00048		.67270	92.1	.32730
.0172	.67410	92.1	.00048		.67362	91.9	.32638
.0173	.67503	91.9	.00049		.67454	91.7	.32546
.0174	.67594	91.7	.00049		.67545	91.5	.32455
0.0175	8.67685	91.5	0.00049	0.2	8.67637	91.3	1.32363
.0176	.67777	91.3	.00049		.67728	91.1	.32272
.0177	.67868	91.1	.00049		.67819	90.9	.32181
.0178	.67959	90.9	.00050		.67910	90.7	.32090
.0179	.68050	90.7	.00050		.68000	90.5	.32000
0.0180	8.68141	90.5	0.00050	0.2	8.68091	90.3	1.31909
.0181	.68231	90.3	.00050		.68181	90.2	.31819
.0182	.68322	90.1	.00050		.68271	90.0	.31729
.0183	.68412	89.9	.00051		.68361	89.8	.31639
.0184	.68501	89.8	.00051		.68451	89.6	.31549
0.0185	8.68591	89.6	0.00051	0.2	8.68540	89.4	1.31460
.0186	.68681	89.4	.00051		.68529	89.2	.31371
.0187	.68770	89.3	.00051		.68619	89.0	.31281
.0188	.68859	89.1	.00052		.68708	88.9	.31192
.0189	.68948	88.9	.00052		.68797	88.7	.31101
0.0190	8.69037	88.7	0.00052	0.2	8.68985	88.5	1.31015
.0191	.69126	88.5	.00052		.69073	88.3	.30927
.0192	.69214	88.3	.00053		.69161	88.1	.30839
.0193	.69302	88.2	.00053		.69250	87.9	.30750
.0194	.69390	88.0	.00053		.69337	87.8	.30663
0.0195	8.69478	87.8	0.00053	0.2	8.69425	87.6	1.30575
.0196	.69566	87.6	.00053		.69513	87.4	.30487
.0197	.69654	87.5	.00054		.69600	87.2	.30400
.0198	.69741	87.3	.00054		.69687	87.1	.30313
.0199	.69828	87.1	.00054		.69774	86.9	.30226
0.0500	8.69915	86.9	0.00054	0.2	8.69861	86.7	1.30139
$u$	$\log \tanh u$	$\omega F_u'$	$\log \sec u$	$\omega F_u'$	$\log \sin u$	$\omega F_u'$	$\log \csc u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0500	8.69915	85,9	0.00054	0,2	8.69851	85,7	1.30139
.0501	.70002	85,8	.00054		.69947	85,5	.30053
.0502	.70089	85,6	.00055		.70034	85,4	.29966
.0503	.70175	85,4	.00055		.70120	85,2	.29880
.0504	.70261	85,2	.00055		.70205	85,0	.29794
0.0505	8.70348	85,1	0.00055	0,2	8.70292	85,0	1.29708
.0506	.70434	85,0	.00055		.70378	85,7	.29622
.0507	.70519	85,7	.00055		.70464	85,5	.29536
.0508	.70605	85,6	.00055		.70549	85,3	.29451
.0509	.70691	85,4	.00055		.70634	85,2	.29365
0.0510	8.70776	85,2	0.00055	0,2	8.70719	85,0	1.29281
.0511	.70861	85,1	.00057		.70804	84,8	.29196
.0512	.70946	84,9	.00057		.70889	84,7	.29111
.0513	.71031	84,7	.00057		.70974	84,5	.29026
.0514	.71115	84,6	.00057		.71058	84,3	.28942
0.0515	8.71200	84,4	0.00058	0,2	8.71142	84,2	1.28858
.0516	.71284	84,2	.00058		.71226	84,0	.28774
.0517	.71368	84,1	.00058		.71310	83,9	.28690
.0518	.71452	83,9	.00058		.71394	83,7	.28606
.0519	.71536	83,8	.00058		.71478	83,5	.28522
0.0520	8.71620	83,6	0.00059	0,2	8.71561	83,4	1.28439
.0521	.71703	83,4	.00059		.71644	83,2	.28355
.0522	.71787	83,3	.00059		.71728	83,0	.28272
.0523	.71870	83,1	.00059		.71811	82,9	.28189
.0524	.71953	83,0	.00060		.71893	82,7	.28107
0.0525	8.72035	82,8	0.00060	0,2	8.71976	82,6	1.28024
.0526	.72119	82,6	.00060		.72059	82,4	.27941
.0527	.72201	82,5	.00060		.72141	82,3	.27859
.0528	.72284	82,3	.00061		.72223	82,1	.27777
.0529	.72365	82,2	.00061		.72305	81,9	.27695
0.0530	8.72448	82,0	0.00061	0,2	8.72387	81,8	1.27613
.0531	.72530	81,9	.00061		.72469	81,6	.27531
.0532	.72612	81,7	.00061		.72550	81,5	.27450
.0533	.72693	81,6	.00062		.72632	81,3	.27368
.0534	.72775	81,4	.00062		.72713	81,2	.27287
0.0535	8.72856	81,3	0.00062	0,2	8.72794	81,0	1.27205
.0536	.72937	81,1	.00062		.72875	80,9	.27125
.0537	.73018	81,0	.00063		.72956	80,7	.27044
.0538	.73099	80,8	.00063		.73036	80,6	.26964
.0539	.73180	80,7	.00063		.73117	80,4	.26883
0.0540	8.73260	80,5	0.00063	0,2	8.73197	80,3	1.26803
.0541	.73341	80,4	.00064		.73277	80,1	.26723
.0542	.73421	80,2	.00064		.73357	80,0	.26643
.0543	.73501	80,1	.00064		.73436	79,8	.26564
.0544	.73581	79,9	.00064		.73517	79,7	.26483
0.0545	8.73661	79,8	0.00064	0,2	8.73597	79,5	1.26403
.0546	.73741	79,6	.00065		.73676	79,4	.26324
.0547	.73820	79,5	.00065		.73755	79,2	.26245
.0548	.73900	79,3	.00065		.73835	79,1	.26165
.0549	.73979	79,2	.00065		.73914	78,9	.26086
0.0550	8.74058	79,0	0.00065	0,2	8.73993	78,8	1.26007
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\infty F_u'$	$\log \cosh u$	$\infty F_u'$	$\log \tanh u$	$\infty F_u'$	$\log \coth u$
0.0350	8.74058	78.0	0.00066	0.2	8.73993	78.8	1.25007
0.0351	741.37	78.0	0.00066		740.71	78.7	1.25039
0.0352	742.16	78.8	0.00066		741.50	78.5	1.25050
0.0353	743.05	78.6	0.00066		742.28	78.4	1.25072
0.0354	743.73	78.5	0.00067		743.07	78.2	1.25093
0.0355	8.74452	78.3	0.00067	0.2	8.74385	78.1	1.25015
0.0356	745.30	78.2	0.00067		744.93	77.9	1.25037
0.0357	746.03	78.0	0.00067		745.11	77.8	1.25050
0.0358	746.86	77.9	0.00068		746.08	77.7	1.25082
0.0359	747.01	77.8	0.00068		746.96	77.5	1.25101
0.0360	8.74811	77.6	0.00068	0.2	8.74773	77.4	1.25127
0.0361	749.00	77.5	0.00068		748.51	77.3	1.25149
0.0362	749.70	77.4	0.00069		749.28	77.1	1.25072
0.0363	750.74	77.2	0.00069		750.05	77.0	1.25095
0.0364	751.51	77.1	0.00069		750.82	76.8	1.25118
0.0365	8.75128	76.9	0.00069	0.2	8.75159	76.7	1.25141
0.0366	753.05	76.8	0.00070		753.35	76.6	1.25165
0.0367	753.63	76.7	0.00070		753.13	76.4	1.25188
0.0368	754.18	76.5	0.00070		753.88	76.3	1.25212
0.0369	755.35	76.4	0.00070		754.64	76.2	1.25236
0.0370	8.75611	76.3	0.00071	0.2	8.75540	76.0	1.25160
0.0371	756.87	76.1	0.00071		756.06	75.9	1.25184
0.0372	757.03	76.0	0.00071		756.92	75.8	1.25208
0.0373	758.30	75.9	0.00071		757.68	75.6	1.25232
0.0374	759.05	75.7	0.00072		758.11	75.5	1.25156
0.0375	8.76091	75.6	0.00072	0.2	8.75991	75.4	1.25181
0.0376	760.66	75.5	0.00072	0.2	759.91	75.2	1.25205
0.0377	761.43	75.4	0.00072	0.3	760.69	75.1	1.25229
0.0378	762.17	75.3	0.00073		761.41	75.0	1.25256
0.0379	762.92	75.1	0.00073		762.19	74.8	1.25281
0.0380	8.76467	75.0	0.00073	0.3	8.76291	74.7	1.25305
0.0381	764.12	74.8	0.00073		763.69	74.6	1.25331
0.0382	765.17	74.7	0.00074		764.43	74.5	1.25355
0.0383	765.91	74.6	0.00074		765.18	74.3	1.25382
0.0384	766.66	74.5	0.00074		765.92	74.2	1.25408
0.0385	8.76940	74.3	0.00074	0.3	8.76666	74.1	1.25334
0.0386	768.15	74.2	0.00075		766.40	73.9	1.25360
0.0387	768.89	74.1	0.00075		768.11	73.8	1.25386
0.0388	769.64	73.9	0.00075		768.88	73.7	1.25412
0.0389	770.17	73.8	0.00075		769.61	73.6	1.25439
0.0390	8.77110	73.7	0.00076	0.3	8.77035	73.4	1.25465
0.0391	771.81	73.6	0.00076		771.68	73.3	1.25492
0.0392	772.58	73.4	0.00076		771.81	73.2	1.25519
0.0393	773.33	73.3	0.00076		772.55	73.1	1.25545
0.0394	774.04	73.2	0.00077		773.28	72.9	1.25572
0.0395	8.77477	73.1	0.00077	0.3	8.77400	72.8	1.25600
0.0396	775.50	73.0	0.00077		774.73	72.7	1.25627
0.0397	776.23	72.8	0.00077		775.46	72.6	1.25654
0.0398	776.96	72.7	0.00078		776.18	72.5	1.25682
0.0399	777.69	72.6	0.00078		776.91	72.3	1.25709
0.0400	8.77811	72.5	0.00078	0.3	8.77763	72.2	1.25737
$u$	$\log \sinh u$	$\infty F_u'$	$\log \cosh u$	$\infty F_u'$	$\log \tanh u$	$\infty F_u'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_1'$	$\log \cosh u$	$\omega F_2'$	$\log \tanh u$	$\omega F_3'$	$\log \coth u$
0.0600	8.77811	72.5	0.00078	0.3	8.77763	72.2	1.22107
.0601	.77914	72.3	.00078		.77865	72.1	.22106
.0602	.77986	72.2	.00079		.77937	72.0	.22103
.0603	.78058	72.1	.00079		.77999	71.8	.22101
.0604	.78130	72.0	.00079		.78061	71.7	.22100
0.0605	8.78202	71.9	0.00079	0.3	8.78153	71.6	1.221877
.0606	.78274	71.8	.00080		.78224	71.5	.22186
.0607	.78346	71.6	.00080		.78296	71.4	.22184
.0608	.78417	71.5	.00080		.78367	71.3	.22183
.0609	.78489	71.4	.00080		.78438	71.1	.22182
0.0610	8.78560	71.3	0.00081	0.3	8.78510	71.0	1.222521
.0611	.78631	71.2	.00081		.78580	70.9	.22250
.0612	.78702	71.1	.00081		.78651	70.8	.22249
.0613	.78773	70.9	.00082		.78722	70.7	.22248
.0614	.78844	70.8	.00082		.78793	70.6	.22247
0.0615	8.78915	70.7	0.00082	0.3	8.78865	70.1	1.223167
.0616	.78986	70.6	.00082		.78936	70.3	.22315
.0617	.79056	70.5	.00083		.79006	70.2	.22312
.0618	.79127	70.4	.00083		.79077	70.1	.22310
.0619	.79197	70.3	.00083		.79147	70.0	.22308
0.0620	8.79267	70.1	0.00083	0.3	8.79217	69.0	1.223816
.0621	.79337	70.0	.00084		.79287	69.8	.22380
.0622	.79407	69.9	.00084		.79357	69.6	.22377
.0623	.79477	69.8	.00084		.79427	69.5	.22375
.0624	.79547	69.7	.00084		.79497	69.4	.22373
0.0625	8.79616	69.6	0.00085	0.3	8.79566	69.3	1.224488
.0626	.79686	69.5	.00085		.79636	69.2	.22447
.0627	.79755	69.4	.00085		.79705	69.1	.22445
.0628	.79825	69.2	.00086		.79775	69.0	.22443
.0629	.79894	69.1	.00086		.79844	68.9	.22442
0.0630	8.79963	69.0	0.00086	0.3	8.79913	68.8	1.225184
.0631	.80032	68.9	.00086		.79982	68.7	.22517
.0632	.80101	68.8	.00087		.80051	68.6	.22515
.0633	.80169	68.7	.00087		.80120	68.5	.22513
.0634	.80238	68.6	.00087		.80189	68.4	.22512
0.0635	8.80307	68.5	0.00088	0.3	8.80257	68.3	1.225881
.0636	.80375	68.4	.00088		.80257	68.2	.22587
.0637	.80443	68.3	.00088		.80325	68.1	.22585
.0638	.80512	68.2	.00088		.80394	68.0	.22583
.0639	.80580	68.1	.00089		.80462	67.9	.22582
0.0640	8.80648	68.0	0.00089	0.3	8.80598	67.7	1.226641
.0641	.80716	67.8	.00089		.80566	67.6	.22663
.0642	.80783	67.7	.00089		.80634	67.5	.22661
.0643	.80851	67.6	.00090		.80702	67.4	.22659
.0644	.80919	67.5	.00090		.80770	67.3	.22657
0.0645	8.80986	67.4	0.00090	0.3	8.80936	67.1	1.227304
.0646	.81053	67.3	.00091		.80943	67.0	.22729
.0647	.81121	67.2	.00091		.81010	66.9	.22727
.0648	.81188	67.1	.00091		.81077	66.8	.22725
.0649	.81255	67.0	.00091		.81144	66.7	.22723
0.0650	8.81322	66.9	0.00092	0.3	8.81270	66.6	1.227970
$u$	$\log \tanh u$	$\omega F_4'$	$\log \coth u$	$\omega F_5'$	$\log \sinh u$	$\omega F_6'$	$\log \cosh u$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.0050	8.81422	66.0	0.00002	0.3	8.81230	66.6	1.18270
0.0051	8.81439	66.8	.00002		8.81297	66.5	1.18293
0.0052	8.81456	66.7	.00002		8.81303	66.4	1.18337
0.0053	8.81522	66.6	.00003		8.81430	66.3	1.18570
0.0054	8.81559	66.5	.00003		8.81496	66.2	1.18564
0.0055	8.81685	66.4	0.00003	0.3	8.81562	66.1	1.18438
0.0056	8.81722	66.3	.00003		8.81628	66.0	1.18372
0.0057	8.81788	66.2	.00004		8.81694	65.9	1.18306
0.0058	8.81854	66.1	.00004		8.81700	65.8	1.18240
0.0059	8.81920	66.0	.00004		8.81826	65.7	1.18174
0.0060	8.81985	65.9	0.00005	0.3	8.81891	65.6	1.18109
0.0061	8.82052	65.8	.00005		8.81957	65.5	1.18043
0.0062	8.82118	65.7	.00005		8.82022	65.4	1.17978
0.0063	8.82184	65.6	.00005		8.82088	65.3	1.17912
0.0064	8.82249	65.5	.00006		8.82153	65.2	1.17847
0.0065	8.82314	65.4	0.00005	0.3	8.82218	65.1	1.17782
0.0066	8.82380	65.3	.00006		8.82283	65.0	1.17717
0.0067	8.82445	65.2	.00007		8.82348	64.9	1.17652
0.0068	8.82510	65.1	.00007		8.82413	64.8	1.17587
0.0069	8.82575	65.0	.00007		8.82478	64.7	1.17522
0.0070	8.82640	64.9	0.00007	0.3	8.82543	64.6	1.17457
0.0071	8.82705	64.8	.00008		8.82607	64.5	1.17393
0.0072	8.82770	64.7	.00008		8.82672	64.4	1.17328
0.0073	8.82834	64.6	.00008		8.82736	64.3	1.17264
0.0074	8.82899	64.5	.00009		8.82800	64.2	1.17200
0.0075	8.82963	64.4	0.00009	0.3	8.82864	64.1	1.17136
0.0076	8.83028	64.3	.00009		8.82929	64.0	1.17071
0.0077	8.83092	64.2	.00009		8.82993	63.9	1.17006
0.0078	8.83156	64.1	.00100		8.83056	63.8	1.16941
0.0079	8.83220	64.0	.00100		8.83120	63.7	1.16876
0.0080	8.83284	63.9	0.00100	0.3	8.83184	63.6	1.16811
0.0081	8.83348	63.8	.00101		8.83248	63.5	1.16746
0.0082	8.83412	63.7	.00101		8.83311	63.4	1.16681
0.0083	8.83476	63.6	.00101		8.83375	63.3	1.16616
0.0084	8.83539	63.5	.00102		8.83438	63.2	1.16551
0.0085	8.83603	63.4	0.00102	0.3	8.83501	63.1	1.16486
0.0086	8.83666	63.3	.00102		8.83564	63.0	1.16421
0.0087	8.83730	63.2	.00102		8.83627	62.9	1.16356
0.0088	8.83793	63.1	.00103		8.83690	62.8	1.16291
0.0089	8.83856	63.0	.00103		8.83753	62.7	1.16226
0.0090	8.83920	62.9	0.00103	0.3	8.83816	62.6	1.16161
0.0091	8.83982	62.8	.00104		8.83879	62.5	1.16096
0.0092	8.84045	62.7	.00104		8.83941	62.4	1.16031
0.0093	8.84108	62.6	.00104		8.84004	62.3	1.15966
0.0094	8.84171	62.5	.00105		8.84066	62.2	1.15901
0.0095	8.84233	62.4	0.00105	0.3	8.84129	62.1	1.15836
0.0096	8.84296	62.3	.00105		8.84191	62.0	1.15771
0.0097	8.84358	62.2	.00105		8.84253	61.9	1.15706
0.0098	8.84421	62.1	.00106		8.84315	61.8	1.15641
0.0099	8.84483	62.0	.00106		8.84377	61.7	1.15576
0.0700	8.84545	61.9	0.00106	0.3	8.84439	61.6	1.15511
$u$	$\log \tanh u$	$\omega F_0'$	$\log \sec u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \csc u$



# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0700	8.84545	62.1	0.00105	0.3	8.84439	61.8	1.15361
.0701	.84607	62.1	.00107		.84501	61.8	.15409
.0702	.84669	62.0	.00107		.84562	61.7	.15458
.0703	.84731	61.9	.00107		.84624	61.6	.15506
.0704	.84793	61.8	.00108		.84686	61.5	.15554
0.0705	8.84855	61.7	0.00108	0.3	8.84747	61.4	1.15603
.0706	.84917	61.6	.00108		.84808	61.3	.15652
.0707	.84978	61.5	.00108		.84870	61.2	.15700
.0708	.85040	61.4	.00109		.84931	61.1	.15749
.0709	.85101	61.3	.00109		.84992	61.0	.15798
0.0710	8.85162	61.3	0.00109	0.3	8.85054	61.0	1.15847
.0711	.85224	61.2	.00110		.85114	60.9	.15895
.0712	.85285	61.1	.00110		.85175	60.8	.15943
.0713	.85346	61.0	.00110		.85236	60.7	.15992
.0714	.85407	60.9	.00111		.85297	60.6	.16040
0.0715	8.85468	60.8	0.00111	0.3	8.85357	60.5	1.16089
.0716	.85528	60.8	.00111		.85417	60.4	.16138
.0717	.85589	60.7	.00112		.85478	60.4	.16186
.0718	.85650	60.6	.00112		.85538	60.3	.16235
.0719	.85710	60.5	.00112		.85598	60.2	.16283
0.0720	8.85771	60.4	0.00112	0.3	8.85658	60.1	1.16332
.0721	.85831	60.3	.00113		.85718	60.0	.16380
.0722	.85891	60.3	.00113		.85778	59.9	.16428
.0723	.85952	60.2	.00113		.85838	59.9	.16476
.0724	.86012	60.1	.00114		.85898	59.8	.16524
0.0725	8.86072	60.0	0.00114	0.3	8.86038	59.7	1.16573
.0726	.86132	59.9	.00114		.86097	59.6	.16621
.0727	.86192	59.8	.00115		.86157	59.5	.16669
.0728	.86251	59.8	.00115		.86217	59.5	.16717
.0729	.86311	59.7	.00115		.86276	59.4	.16765
0.0730	8.86371	59.6	0.00116	0.3	8.86335	59.3	1.16814
.0731	.86430	59.5	.00116		.86394	59.2	.16862
.0732	.86490	59.4	.00116		.86454	59.1	.16910
.0733	.86549	59.4	.00117		.86513	59.0	.16958
.0734	.86609	59.3	.00117		.86572	59.0	.17006
0.0735	8.86668	59.2	0.00117	0.3	8.86631	58.9	1.17055
.0736	.86727	59.1	.00118		.86690	58.8	.17103
.0737	.86786	59.0	.00118		.86748	58.7	.17151
.0738	.86845	59.0	.00118		.86807	58.6	.17199
.0739	.86904	58.9	.00118		.86865	58.6	.17247
0.0740	8.86963	58.8	0.00119	0.3	8.86924	58.5	1.17296
.0741	.87022	58.7	.00119		.87001	58.4	.17344
.0742	.87080	58.6	.00119		.87060	58.3	.17392
.0743	.87139	58.6	.00120		.87119	58.2	.17440
.0744	.87197	58.5	.00120		.87177	58.1	.17488
0.0745	8.87256	58.4	0.00120	0.3	8.87215	58.1	1.17537
.0746	.87314	58.3	.00121		.87273	58.0	.17585
.0747	.87372	58.2	.00121		.87331	57.9	.17633
.0748	.87431	58.2	.00121		.87390	57.8	.17681
.0749	.87489	58.1	.00122		.87447	57.7	.17729
0.0750	8.87547	58.0	0.00122	0.3	8.87505	57.6	1.17778
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.0730	8.87547	57.0	0.00122	0.3	8.87125	57.7	1.12575
0.0731	8.87563	57.0	0.00122		8.87181	57.6	1.12568
0.0732	8.87579	57.0	0.00123		8.87240	57.5	1.12460
0.0733	8.87594	57.8	0.00123		8.87308	57.5	1.12402
0.0734	8.87773	57.7	0.00123		8.87355	57.4	1.12345
0.0735	8.87846	57.6	0.00124	0.3	8.87712	57.3	1.12288
0.0736	8.87891	57.6	0.00124		8.87770	57.2	1.12230
0.0737	8.87931	57.5	0.00124		8.87827	57.2	1.12173
0.0738	8.88000	57.4	0.00125		8.87884	57.1	1.12116
0.0739	8.88060	57.3	0.00125		8.87941	57.0	1.12059
0.0740	8.88115	57.3	0.00125	0.3	8.87998	56.9	1.12002
0.0741	8.88180	57.2	0.00125		8.88055	56.8	1.11945
0.0742	8.88243	57.1	0.00126		8.88112	56.8	1.11888
0.0743	8.88305	57.0	0.00126		8.88168	56.7	1.11832
0.0744	8.88352	57.0	0.00127		8.88225	56.6	1.11775
0.0745	8.88408	56.9	0.00127	0.3	8.88282	56.5	1.11718
0.0746	8.88465	56.8	0.00127		8.88338	56.5	1.11662
0.0747	8.88522	56.7	0.00128		8.88394	56.4	1.11606
0.0748	8.88579	56.7	0.00128		8.88451	56.3	1.11549
0.0749	8.88635	56.6	0.00128		8.88507	56.3	1.11493
0.0750	8.88693	56.5	0.00129	0.3	8.88563	56.2	1.11437
0.0751	8.88748	56.4	0.00129		8.88620	56.1	1.11380
0.0752	8.88805	56.4	0.00129		8.88676	56.0	1.11324
0.0753	8.88861	56.3	0.00130		8.88732	56.0	1.11268
0.0754	8.88917	56.2	0.00130		8.88787	55.9	1.11213
0.0755	8.88974	56.2	0.00130	0.3	8.88843	55.8	1.11157
0.0756	8.89030	56.1	0.00131		8.88899	55.7	1.11101
0.0757	8.89086	56.0	0.00131		8.88955	55.7	1.11045
0.0758	8.89142	55.9	0.00131		8.89010	55.6	1.10989
0.0759	8.89198	55.9	0.00132		8.89066	55.5	1.10934
0.0760	8.89253	55.8	0.00132	0.3	8.89122	55.5	1.10878
0.0761	8.89309	55.7	0.00132		8.89177	55.4	1.10823
0.0762	8.89365	55.6	0.00133		8.89232	55.3	1.10768
0.0763	8.89421	55.6	0.00133		8.89288	55.2	1.10712
0.0764	8.89476	55.5	0.00133		8.89343	55.2	1.10657
0.0765	8.89533	55.4	0.00134	0.3	8.89398	55.1	1.10602
0.0766	8.89587	55.4	0.00134		8.89453	55.0	1.10547
0.0767	8.89642	55.3	0.00134		8.89508	55.0	1.10492
0.0768	8.89698	55.2	0.00135		8.89563	54.9	1.10437
0.0769	8.89753	55.2	0.00135		8.89618	54.8	1.10382
0.0770	8.89808	55.1	0.00135	0.3	8.89672	54.7	1.10328
0.0771	8.89863	55.0	0.00136		8.89727	54.7	1.10273
0.0772	8.89918	54.9	0.00136		8.89782	54.6	1.10218
0.0773	8.89973	54.9	0.00136		8.89836	54.5	1.10164
0.0774	9.00028	54.8	0.00137		8.89891	54.5	1.10109
0.0775	8.90082	54.7	0.00137	0.3	8.89945	54.4	1.10055
0.0776	9.00137	54.7	0.00137		9.00000	54.3	1.09999
0.0777	9.00192	54.6	0.00138		9.00054	54.3	1.09946
0.0778	9.00246	54.5	0.00138		9.00108	54.2	1.09892
0.0779	9.00301	54.5	0.00138		9.00162	54.1	1.09838
0.0800	8.90355	54.4	0.00139	0.3	8.90216	54.1	1.09784
$u$	$\log \tan gd u$	$\omega F_0'$	$\log \sec gd u$	$\omega F_0'$	$\log \sin gd u$	$\omega F_0'$	$\log \csc gd u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0800	8.90355	54.1	0.00139	0.3	8.90355	54.1	1.09784
.0801	.90410	54.3	.00139		.90371	54.0	.09729
.0802	.90464	54.3	.00140		.90324	54.0	.09676
.0803	.90518	54.2	.00140		.90280	54.0	.09620
.0804	.90572	54.1	.00140		.90234	54.3	.09568
0.0805	8.90626	54.1	0.00141	0.3	8.90626	54.7	1.09514
.0806	.90681	54.0	.00141	0.3	.90540	54.0	.09460
.0807	.90734	53.9	.00141	0.3	.90503	54.0	.09407
.0808	.90788	53.9	.00142	0.4	.90467	53.5	.09353
.0809	.90842	53.8	.00142	0.4	.90400	53.4	.09300
0.0810	8.90896	53.7	0.00142	0.4	8.90896	53.1	1.09246
.0811	.90950	53.7	.00143		.90850	53.3	.09193
.0812	.91003	53.0	.00143		.90800	53.3	.09140
.0813	.91057	53.5	.00143		.90754	53.4	.09086
.0814	.91110	53.5	.00144		.90707	53.1	.09033
0.0815	8.91164	53.4	0.00144	0.4	8.91164	53.4	1.08980
.0816	.91217	53.3	.00144		.91073	53.0	.08927
.0817	.91271	53.3	.00145		.91030	52.0	.08874
.0818	.91324	53.2	.00145		.91170	53.0	.08821
.0819	.91377	53.1	.00145		.91231	53.3	.08769
0.0820	8.91430	53.1	0.00146	0.4	8.91430	53.7	1.08716
.0821	.91483	53.0	.00146		.91337	53.7	.08663
.0822	.91536	53.0	.00147		.91300	53.0	.08610
.0823	.91589	52.0	.00147		.91413	53.3	.08558
.0824	.91642	52.8	.00147		.91495	53.3	.08505
0.0825	8.91695	52.8	0.00148	0.4	8.91695	53.4	1.08453
.0826	.91747	52.7	.00148		.91500	53.3	.08401
.0827	.91800	52.6	.00148		.91552	53.3	.08348
.0828	.91853	52.6	.00149		.91704	53.3	.08296
.0829	.91905	52.5	.00149		.91750	53.4	.08244
0.0830	8.91958	52.4	0.00149	0.4	8.91958	53.4	1.08192
.0831	.92010	52.4	.00150		.91850	53.0	.08140
.0832	.92062	52.3	.00150		.91912	53.0	.08088
.0833	.92115	52.3	.00151		.91964	51.0	.08036
.0834	.92167	52.2	.00151		.92016	51.3	.07984
0.0835	8.92219	52.1	0.00151	0.4	8.92219	51.8	1.07932
.0836	.92271	52.1	.00152		.92130	51.7	.07880
.0837	.92323	52.0	.00152		.92171	51.0	.07829
.0838	.92375	51.0	.00152		.92223	51.0	.07777
.0839	.92427	51.0	.00153		.92274	51.3	.07726
0.0840	8.92479	51.8	0.00153	0.4	8.92479	51.3	1.07674
.0841	.92531	51.8	.00153		.92377	51.1	.07623
.0842	.92583	51.7	.00154		.92420	51.3	.07571
.0843	.92634	51.6	.00154		.92480	51.3	.07520
.0844	.92686	51.6	.00154		.92531	51.2	.07469
0.0845	8.92737	51.5	0.00155	0.4	8.92737	51.4	1.07418
.0846	.92789	51.5	.00155		.92634	51.1	.07366
.0847	.92840	51.4	.00156		.92685	51.0	.07315
.0848	.92892	51.3	.00156		.92736	51.0	.07264
.0849	.92943	51.3	.00156		.92787	50.0	.07213
0.0850	8.92994	51.2	0.00157	0.4	8.92994	50.8	1.07163
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
0.0050	8.02924	51.2	0.00157	0.4	8.92847	50.8	1.07163
0.0051	0.3045	51.3	0.00157		0.28888	50.8	0.7112
0.0052	0.3090	51.4	0.00157		0.2930	50.7	0.7060
0.0053	0.3133	51.0	0.00158		0.2990	50.7	0.7010
0.0054	0.3179	51.0	0.00158		0.3040	50.6	0.6960
0.0055	8.03350	50.0	0.00159	0.4	8.93091	50.5	1.06009
0.0056	0.3300	50.0	0.00159		0.3141	50.5	0.6850
0.0057	0.3351	50.8	0.00159		0.3192	50.4	0.6808
0.0058	0.3402	50.7	0.00160		0.3242	50.4	0.6758
0.0059	0.3453	50.7	0.00160		0.3293	50.3	0.6707
0.0060	8.03503	50.6	0.00160	0.4	8.93343	50.3	1.05057
0.0061	0.3554	50.6	0.00161		0.3303	50.2	0.6607
0.0062	0.3604	50.5	0.00161		0.3343	50.1	0.6557
0.0063	0.3655	50.4	0.00161		0.3393	50.1	0.6507
0.0064	0.3705	50.4	0.00162		0.3443	50.0	0.6457
0.0065	8.04256	50.3	0.00162	0.4	8.93593	50.0	1.05407
0.0066	0.3800	50.3	0.00163		0.3503	49.9	0.6357
0.0067	0.3850	50.2	0.00163		0.3553	49.8	0.6307
0.0068	0.3900	50.1	0.00163		0.3603	49.8	0.6257
0.0069	0.3957	50.1	0.00164		0.3653	49.7	0.6207
0.0070	8.04407	50.0	0.00164	0.4	8.93843	49.7	1.06187
0.0071	0.4057	50.0	0.00165		0.3704	49.6	0.6168
0.0072	0.4107	49.9	0.00165		0.3754	49.6	0.6118
0.0073	0.4157	49.9	0.00165		0.3804	49.5	0.6069
0.0074	0.4209	49.8	0.00165		0.3854	49.4	0.6019
0.0075	8.04556	49.8	0.00165	0.4	8.94090	49.4	1.05010
0.0076	0.4300	49.7	0.00166		0.4140	49.3	0.5850
0.0077	0.4350	49.6	0.00167		0.4180	49.3	0.5811
0.0078	0.4400	49.6	0.00167		0.4230	49.2	0.5762
0.0079	0.4455	49.5	0.00168		0.4287	49.2	0.5713
0.0080	8.04704	49.5	0.00168	0.4	8.94336	49.1	1.05664
0.0081	0.4551	49.4	0.00168		0.4385	49.0	0.5615
0.0082	0.4601	49.4	0.00169		0.4434	49.0	0.5566
0.0083	0.4652	49.3	0.00169		0.4483	48.9	0.5517
0.0084	0.4703	49.3	0.00169		0.4532	48.9	0.5468
0.0085	8.04751	49.2	0.00170	0.4	8.94581	48.8	1.05419
0.0086	0.4800	49.1	0.00170		0.4630	48.8	0.5370
0.0087	0.4850	49.1	0.00171		0.4679	48.7	0.5321
0.0088	0.4900	49.0	0.00171		0.4727	48.7	0.5273
0.0089	0.4957	49.0	0.00171		0.4776	48.6	0.5224
0.0090	8.04996	48.9	0.00172	0.4	8.94825	48.5	1.05175
0.0091	0.5045	48.9	0.00172		0.4823	48.5	0.5127
0.0092	0.5094	48.8	0.00173		0.4872	48.4	0.5078
0.0093	0.5143	48.8	0.00173		0.4920	48.4	0.5030
0.0094	0.5192	48.7	0.00173		0.5018	48.3	0.4982
0.0095	8.05140	48.7	0.00174	0.4	8.95069	48.3	1.04933
0.0096	0.5280	48.6	0.00174		0.5115	48.2	0.4885
0.0097	0.5337	48.5	0.00174		0.5163	48.2	0.4837
0.0098	0.5386	48.5	0.00175		0.5211	48.1	0.4789
0.0099	0.5434	48.4	0.00175		0.5259	48.0	0.4741
0.0000	8.05184	48.4	0.00176	0.4	8.05307	48.0	1.04693
$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.0000	8.95483	48.4	0.00176	0.4	8.95307	48.0	1.04693
.0001	.95531	48.3	.00176		.95355	47.9	.04645
.0002	.95580	48.3	.00176		.95403	47.9	.04597
.0003	.95628	48.2	.00177		.95451	47.8	.04549
.0004	.95676	48.2	.00177		.95499	47.8	.04501
0.0005	8.95724	48.1	0.00178	0.4	8.95547	47.7	1.04453
.0006	.95772	48.1	.00178		.95594	47.7	.04406
.0007	.95820	48.0	.00178		.95642	47.6	.04358
.0008	.95868	48.0	.00179		.95689	47.6	.04311
.0009	.95916	47.9	.00179		.95737	47.5	.04263
0.0010	8.95964	47.9	0.00180	0.4	8.95784	47.5	1.04216
.0011	.96012	47.8	.00180		.95832	47.4	.04168
.0012	.96060	47.8	.00180		.95879	47.4	.04121
.0013	.96107	47.7	.00181		.95927	47.3	.04073
.0014	.96155	47.6	.00181		.95974	47.3	.04026
0.0015	8.96203	47.6	0.00182	0.4	8.96021	47.2	1.03979
.0016	.96250	47.5	.00182		.96068	47.1	.03932
.0017	.96298	47.5	.00182		.96115	47.1	.03885
.0018	.96345	47.4	.00183		.96163	47.0	.03837
.0019	.96393	47.4	.00183		.96210	47.0	.03790
0.0020	8.96440	47.3	0.00184	0.4	8.96256	46.9	1.03744
.0021	.96487	47.3	.00184		.96303	46.9	.03697
.0022	.96535	47.2	.00184		.96350	46.8	.03650
.0023	.96582	47.2	.00185		.96397	46.8	.03603
.0024	.96629	47.1	.00185		.96444	46.7	.03556
0.0025	8.96676	47.1	0.00185	0.4	8.96491	46.7	1.03509
.0026	.96723	47.0	.00185		.96537	46.6	.03463
.0027	.96770	47.0	.00186		.96584	46.6	.03416
.0028	.96817	46.9	.00187		.96630	46.5	.03370
.0029	.96864	46.9	.00187		.96677	46.5	.03323
0.0030	8.96911	46.8	0.00188	0.4	8.96723	46.4	1.03277
.0031	.96958	46.8	.00188		.96770	46.4	.03230
.0032	.97004	46.7	.00188		.96816	46.3	.03184
.0033	.97051	46.7	.00189		.96862	46.3	.03138
.0034	.97098	46.6	.00189		.96909	46.2	.03091
0.0035	8.97144	46.6	0.00190	0.4	8.96955	46.2	1.03045
.0036	.97191	46.5	.00190		.97001	46.1	.03000
.0037	.97237	46.5	.00190		.97047	46.1	.02953
.0038	.97284	46.4	.00191		.97093	46.0	.02907
.0039	.97330	46.4	.00191		.97139	46.0	.02861
0.0040	8.97377	46.3	0.00192	0.4	8.97185	45.9	1.02815
.0041	.97423	46.3	.00192		.97231	45.9	.02769
.0042	.97469	46.2	.00192		.97277	45.8	.02723
.0043	.97516	46.2	.00193		.97323	45.8	.02677
.0044	.97562	46.1	.00193		.97368	45.7	.02632
0.0045	8.97608	46.1	0.00194	0.4	8.97414	45.7	1.02586
.0046	.97654	46.0	.00194		.97460	45.6	.02540
.0047	.97700	46.0	.00194		.97505	45.6	.02495
.0048	.97746	45.9	.00195		.97551	45.5	.02449
.0049	.97792	45.9	.00195		.97597	45.5	.02403
0.0050	8.97838	45.9	0.00196	0.4	8.97642	45.4	1.02358
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_1'$	$\log \cosh u$	$\omega F_2'$	$\log \tanh u$	$\omega F_3'$	$\log \coth u$
0.0050	8.07838	45.0	0.00105	0.4	8.07042	45.4	1.03358
0.0051	0.07839	45.1	0.00106		0.07043	45.4	0.03313
0.0052	0.07840	45.2	0.00107		0.07044	45.3	0.03267
0.0053	0.07841	45.2	0.00107		0.07045	45.3	0.03221
0.0054	0.07842	45.2	0.00107		0.07046	45.3	0.03177
0.0055	8.07843	45.0	0.00108	0.4	8.07850	45.2	1.02131
0.0056	0.07844	45.0	0.00108		0.07851	45.2	0.02086
0.0057	0.07845	45.3	0.00109		0.07852	45.1	0.02041
0.0058	0.07846	45.3	0.00109		0.07853	45.1	0.01995
0.0059	0.07847	45.4	0.00109		0.07854	45.0	0.01951
0.0060	8.07848	45.4	0.00110	0.4	8.07855	45.0	1.01006
0.0061	0.07849	45.3	0.00110		0.07856	44.9	0.01861
0.0062	0.07850	45.3	0.00110		0.07857	44.9	0.01816
0.0063	0.07851	45.4	0.00111		0.07858	44.8	0.01771
0.0064	0.07852	45.5	0.00111		0.07859	44.8	0.01727
0.0065	8.07853	45.1	0.00112	0.4	8.07860	44.7	1.01082
0.0066	0.07854	45.0	0.00112		0.07861	44.7	0.01037
0.0067	0.07855	45.1	0.00113		0.07862	44.6	0.01592
0.0068	0.07856	45.0	0.00113		0.07863	44.6	0.01548
0.0069	0.07857	45.0	0.00113		0.07864	44.5	0.01503
0.0070	8.07858	44.9	0.00114	0.4	8.07865	44.5	1.01459
0.0071	0.07859	44.9	0.00114		0.07866	44.5	0.01414
0.0072	0.07860	44.8	0.00114		0.07867	44.4	0.01370
0.0073	0.07861	44.8	0.00115		0.07868	44.4	0.01325
0.0074	0.07862	44.7	0.00115		0.07869	44.3	0.01281
0.0075	8.07863	44.7	0.00115	0.4	8.07870	44.3	1.01337
0.0076	0.07864	44.9	0.00116		0.07871	44.2	0.01193
0.0077	0.07865	44.6	0.00116		0.07872	44.2	0.01148
0.0078	0.07866	44.5	0.00116		0.07873	44.1	0.01104
0.0079	0.07867	44.5	0.00117		0.07874	44.1	0.01059
0.0080	8.07868	44.5	0.00117	0.4	8.07875	44.0	1.01016
0.0081	0.07869	44.4	0.00117		0.07876	44.0	0.00972
0.0082	0.07870	44.4	0.00118		0.07877	43.9	0.00928
0.0083	0.07871	44.3	0.00118		0.07878	43.9	0.00884
0.0084	0.07872	44.3	0.00118		0.07879	43.9	0.00840
0.0085	8.07873	44.4	0.00119	0.4	8.07880	43.8	1.00797
0.0086	0.07874	44.2	0.00119		0.07881	43.8	0.00753
0.0087	0.07875	44.2	0.00119		0.07882	43.7	0.00709
0.0088	0.07876	44.1	0.00119		0.07883	43.7	0.00665
0.0089	0.07877	44.1	0.00120		0.07884	43.6	0.00622
0.0090	8.07878	44.0	0.00120	0.4	8.07885	43.6	1.00578
0.0091	0.07879	44.0	0.00121		0.07886	43.5	0.00534
0.0092	0.07880	43.9	0.00121		0.07887	43.5	0.00491
0.0093	0.07881	43.9	0.00121		0.07888	43.4	0.00447
0.0094	0.07882	43.8	0.00121		0.07889	43.4	0.00404
0.0095	8.07883	43.8	0.00121	0.4	8.07890	43.4	1.00361
0.0096	0.07884	43.7	0.00121		0.07891	43.3	0.00317
0.0097	0.07885	43.7	0.00121		0.07892	43.3	0.00274
0.0098	0.07886	43.7	0.00121		0.07893	43.2	0.00231
0.0099	0.07887	43.6	0.00121		0.07894	43.2	0.00188
0.1000	9.00072	43.6	0.00127	0.4	8.07895	43.1	1.00144
$u$	$\log \tanh u$	$\omega F_4'$	$\log \operatorname{sech} u$	$\omega F_5'$	$\log \sinh u$	$\omega F_6'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.100	9.00072	435.7	0.00217	4.3	8.99856	431.4	1.00144
.101	.00506	431.5	.00221	4.4	9.00285	427.1	0.99795
.102	.00935	427.3	.00226	4.4	.00710	422.8	.00300
.103	.01360	423.1	.00230	4.5	.01131	418.7	.00800
.104	.01782	419.1	.00234	4.5	.01547	414.6	.01300
0.105	9.02190	415.1	0.00239	4.5	9.01960	410.6	0.01800
.106	.02612	411.2	.00244	4.6	.02368	406.7	.02300
.107	.03021	407.4	.00248	4.6	.02773	402.8	.02800
.108	.03427	403.7	.00253	4.7	.03174	399.0	.03300
.109	.03829	400.0	.00257	4.7	.03571	395.3	.03800
0.110	9.04227	396.4	0.00262	4.8	9.03965	391.6	0.04300
.111	.04621	392.9	.00267	4.8	.04354	388.1	.04800
.112	.05013	389.4	.00272	4.8	.04741	384.5	.05300
.113	.05400	386.0	.00277	4.9	.05124	381.1	.05800
.114	.05785	382.6	.00282	4.9	.05503	377.7	.06300
0.115	9.06165	379.3	0.00287	5.0	9.05879	374.3	0.06800
.116	.06543	376.1	.00292	5.0	.06252	371.1	.07300
.117	.06918	372.9	.00297	5.1	.06621	367.8	.07800
.118	.07289	369.8	.00302	5.1	.06987	364.7	.08300
.119	.07657	366.7	.00307	5.1	.07350	361.5	.08800
0.120	9.08322	363.6	0.00312	5.2	9.07710	358.5	0.09300
.121	.08684	360.7	.00317	5.2	.08069	355.4	.09800
.122	.08944	357.7	.00322	5.3	.08421	352.5	.10300
.123	.09100	354.9	.00328	5.3	.08772	349.6	.10800
.124	.09453	352.0	.00333	5.4	.09120	346.7	.11300
0.125	9.09804	349.2	0.00338	5.4	9.09465	343.8	0.11800
.126	.10152	346.5	.00344	5.4	.09808	341.1	.12300
.127	.10497	343.8	.00349	5.5	.10148	338.3	.12800
.128	.10840	341.1	.00355	5.5	.10485	335.6	.13300
.129	.11179	338.5	.00360	5.6	.10819	333.0	.13800
0.130	9.11517	336.0	0.00366	5.6	9.11151	330.3	0.14300
.131	.11851	333.4	.00372	5.7	.11480	327.8	.14800
.132	.12183	330.9	.00377	5.7	.11806	325.2	.15300
.133	.12513	328.5	.00383	5.7	.12130	322.7	.15800
.134	.12840	326.0	.00389	5.8	.12452	320.3	.16300
0.135	9.13165	323.7	0.00395	5.8	9.12771	317.8	0.16800
.136	.13488	321.3	.00400	5.9	.13087	315.4	.17300
.137	.13808	319.0	.00405	5.9	.13402	313.1	.17800
.138	.14126	316.7	.00412	6.0	.13713	310.7	.18300
.139	.14441	314.5	.00418	6.0	.14023	308.5	.18800
0.140	9.14755	312.2	0.00424	6.0	9.14330	306.2	0.19300
.141	.15066	310.0	.00430	6.1	.14635	304.0	.19800
.142	.15375	307.9	.00436	6.1	.14938	301.8	.20300
.143	.15682	305.8	.00443	6.2	.15239	299.6	.20800
.144	.15986	303.7	.00449	6.2	.15538	297.5	.21300
0.145	9.16289	301.6	0.00455	6.3	9.15834	295.4	0.21800
.146	.16589	299.6	.00461	6.3	.16128	293.3	.22300
.147	.16888	297.6	.00468	6.3	.16420	291.2	.22800
.148	.17185	295.6	.00474	6.4	.16711	289.2	.23300
.149	.17479	293.6	.00480	6.4	.16999	287.2	.23800
0.150	9.17772	291.7	0.00487	6.5	9.17285	285.2	0.24300
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

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# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$\log \tanh u$	$\infty F_0'$	$\log \coth u$
0.150	0.17774	291.7	0.00487	6.5	9.172855	285.2	0.82715
.151	.17803	292.3	.00493	6.5	.17509	285.3	.82731
.152	.17831	292.9	.00500	6.6	.17852	285.4	.82748
.153	.17859	293.4	.00506	6.6	.18133	279.5	.81868
.154	.17887	294.0	.00513	6.6	.18411	277.6	.81589
0.155	0.17916	294.4	0.00520	6.7	9.18687	275.8	0.81313
.156	.17943	294.9	.00526	6.7	.18963	273.9	.81038
.157	.17971	295.0	.00533	6.8	.19235	272.1	.80765
.158	.18000	295.4	.00540	6.8	.19506	270.3	.80494
.159	.18028	295.9	.00547	6.8	.19776	268.6	.80224
0.160	0.18057	296.7	0.00554	6.9	9.20044	266.9	0.79956
.161	.18085	297.1	.00560	6.9	.20310	265.1	.79689
.162	.18113	297.4	.00567	7.0	.20574	263.4	.79426
.163	.18141	297.8	.00574	7.0	.20837	261.8	.79163
.164	.18169	298.2	.00581	7.1	.21097	260.1	.78903
0.165	0.18198	298.6	0.00589	7.1	9.21357	258.5	0.78643
.166	.18226	299.0	.00596	7.1	.21614	256.9	.78386
.167	.18254	299.3	.00603	7.2	.21871	255.3	.78129
.168	.18282	299.7	.00610	7.2	.22125	253.7	.77878
.169	.18310	300.1	.00617	7.3	.22378	252.2	.77622
0.170	0.18339	300.7	0.00625	7.3	9.22639	250.6	0.77371
.171	.18367	301.1	.00632	7.4	.22870	249.1	.77121
.172	.18395	301.4	.00639	7.4	.23128	247.6	.76872
.173	.18423	301.8	.00647	7.4	.23374	246.1	.76626
.174	.18451	302.2	.00654	7.5	.23620	244.6	.76380
0.175	0.18480	302.7	0.00662	7.5	9.23861	243.2	0.76136
.176	.18508	303.1	.00669	7.6	.24105	241.7	.75891
.177	.18536	303.4	.00677	7.6	.24347	240.3	.75653
.178	.18564	303.8	.00684	7.6	.24587	238.9	.75413
.179	.18592	304.2	.00692	7.7	.24825	237.5	.75175
0.180	0.18621	304.7	0.00700	7.7	9.25063	236.1	0.74938
.181	.18649	305.1	.00708	7.8	.25297	234.8	.74703
.182	.18677	305.4	.00715	7.8	.25531	233.4	.74469
.183	.18705	305.8	.00723	7.9	.25764	232.1	.74236
.184	.18733	306.2	.00731	7.9	.25996	230.8	.74004
0.185	0.18762	306.7	0.00739	7.9	9.26226	229.5	0.73774
.186	.18790	307.1	.00747	8.0	.26454	228.2	.73546
.187	.18818	307.4	.00755	8.0	.26684	226.9	.73318
.188	.18846	307.8	.00763	8.1	.26908	225.7	.73092
.189	.18874	308.2	.00771	8.1	.27133	224.4	.72867
0.190	0.18903	308.7	0.00779	8.2	9.27357	223.2	0.72643
.191	.18931	309.1	.00787	8.2	.27580	221.9	.72420
.192	.18959	309.4	.00796	8.2	.27801	220.7	.72199
.193	.18987	309.8	.00804	8.3	.28021	219.5	.71979
.194	.19015	310.2	.00812	8.3	.28240	218.3	.71760
0.195	0.19044	310.7	0.00821	8.4	9.28458	217.2	0.71542
.196	.19072	311.1	.00829	8.4	.28674	216.0	.71326
.197	.19100	311.4	.00837	8.4	.28889	214.9	.71110
.198	.19128	311.8	.00846	8.5	.29104	213.7	.70896
.199	.19156	312.2	.00854	8.5	.29317	212.6	.70683
0.200	0.19185	312.7	0.00863	8.6	9.29539	211.5	0.70471
$u$	$\log \tan gd u$	$\infty F_0'$	$\log \sec gd u$	$\infty F_0'$	$\log \sin gd u$	$\infty F_0'$	$\log \csc gd u$



# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.200	9.30392	220.0	0.00863	8.6	9.30529	211.5	0.20174
.201	.30602	219.0	.00871	8.6	.30740	210.4	.20380
.202	.30830	217.9	.00889	8.7	.30959	209.3	.20590
.203	.31047	216.9	.00889	8.7	.31179	208.2	.20811
.204	.31254	215.8	.00897	8.7	.31396	207.1	.21034
0.205	9.31479	214.8	0.00905	8.8	9.31573	206.0	0.21247
.206	.31693	213.8	.00915	8.8	.31783	205.0	.21452
.207	.31907	212.8	.00924	8.9	.31993	204.0	.21657
.208	.32119	211.8	.00933	8.9	.32206	203.0	.21864
.209	.32330	210.8	.00942	8.9	.32419	202.0	.22071
0.210	9.32541	209.8	0.00951	9.0	9.32530	200.9	0.22279
.211	.32750	208.9	.00960	9.0	.32740	199.8	.22486
.212	.32958	207.9	.00969	9.1	.32950	198.8	.22694
.213	.33166	207.0	.00978	9.1	.33163	197.7	.22902
.214	.33372	206.0	.00987	9.2	.33373	196.7	.23110
0.215	9.33578	205.1	0.00996	9.2	9.33582	195.6	0.23318
.216	.33783	204.2	.01005	9.2	.33787	194.6	.23525
.217	.33985	203.3	.01015	9.3	.33992	193.6	.23733
.218	.34189	202.4	.01024	9.3	.34196	192.6	.23941
.219	.34391	201.5	.01033	9.4	.34398	191.5	.24149
0.220	9.34592	200.6	0.01043	9.4	9.34599	190.5	0.24357
.221	.34792	199.7	.01052	9.4	.34799	189.5	.24564
.222	.34991	198.8	.01060	9.5	.34999	188.5	.24772
.223	.35190	198.0	.01071	9.5	.35199	187.5	.24980
.224	.35387	197.1	.01081	9.6	.35397	186.5	.25188
0.225	9.35584	196.3	0.01090	9.6	9.35591	185.5	0.25396
.226	.35780	195.4	.01100	9.7	.35790	184.5	.25604
.227	.35975	194.6	.01109	9.7	.35985	183.5	.25812
.228	.36169	193.8	.01119	9.7	.36180	182.5	.26020
.229	.36362	193.0	.01129	9.8	.36373	181.5	.26228
0.230	9.36555	192.1	0.01139	9.8	9.36561	180.5	0.26436
.231	.36747	191.3	.01149	9.9	.36768	179.5	.26644
.232	.36938	190.5	.01158	9.9	.36959	178.5	.26852
.233	.37128	189.8	.01168	10.0	.37150	177.5	.27060
.234	.37317	189.0	.01178	10.0	.37340	176.5	.27268
0.235	9.37506	188.2	0.01188	10.0	9.37512	175.5	0.27476
.236	.37694	187.4	.01198	10.1	.37695	174.5	.27684
.237	.37881	186.7	.01208	10.1	.37882	173.5	.27892
.238	.38067	185.9	.01219	10.1	.38068	172.5	.28100
.239	.38252	185.2	.01229	10.2	.38253	171.5	.28308
0.240	9.38437	184.4	0.01239	10.2	9.38443	170.5	0.28516
.241	.38621	183.7	.01249	10.3	.38622	169.5	.28724
.242	.38805	183.0	.01259	10.3	.38805	168.5	.28932
.243	.38987	182.2	.01270	10.3	.38987	167.5	.29140
.244	.39169	181.5	.01280	10.4	.39169	166.5	.29348
0.245	9.39350	180.8	0.01291	10.4	9.39356	165.5	0.29556
.246	.39531	180.1	.01301	10.5	.39530	164.5	.29764
.247	.39710	179.4	.01312	10.5	.39709	163.5	.29972
.248	.39889	178.7	.01322	10.6	.39887	162.5	.30180
.249	.40068	178.0	.01333	10.6	.39965	161.5	.30388
0.250	9.40245	177.3	0.01343	10.6	9.40252	160.5	0.30596
$u$	$\log \tanh u$	$\omega F_0'$	$\log \sec u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \csc u$

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
0.350	0.310715	127.3	0.01343	106	9.38702	106.7	0.01103
0.351	0.31172	126.6	.01351	107	.39000	106.0	.01131
0.352	0.31270	126.0	.01358	107	.39341	105.3	.01160
0.353	0.31374	125.3	.01365	108	.39680	104.5	.01189
0.354	0.31476	124.6	.01373	108	.39955	103.8	.01217
0.355	0.31574	124.0	.01380	108	9.40227	103.1	0.01245
0.356	0.31677	123.3	.01388	109	.40500	102.5	.01273
0.357	0.31776	122.7	.01395	109	.40762	101.8	.01301
0.358	0.31874	122.0	.01403	110	.41024	101.1	.01329
0.359	0.31971	121.3	.01410	110	.41281	100.4	.01356
0.360	0.32067	120.6	0.01418	110	9.41534	150.7	0.01384
0.361	0.32162	120.0	.01425	111	.41793	150.1	.01412
0.362	0.32256	119.3	.01433	111	.42052	155.4	.01440
0.363	0.32350	118.6	.01440	112	.42310	157.8	.01468
0.364	0.32443	118.0	.01448	112	.42568	157.1	.01496
0.365	0.32536	117.3	0.01455	112	9.42821	156.5	0.01524
0.366	0.32629	116.7	.01463	113	.43079	155.8	.01552
0.367	0.32721	116.0	.01470	113	.43336	155.1	.01580
0.368	0.32813	115.3	.01478	114	.43594	154.5	.01608
0.369	0.32905	114.6	.01485	114	.43851	153.9	.01636
0.370	0.33000	114.0	0.01493	114	9.44109	153.3	0.01664
0.371	0.33092	113.3	.01500	115	.44365	152.7	.01692
0.372	0.33184	112.6	.01508	115	.44621	152.1	.01720
0.373	0.33276	112.0	.01515	116	.44878	151.4	.01748
0.374	0.33368	111.3	.01523	116	.45134	150.8	.01776
0.375	0.33460	110.6	0.01530	117	9.45391	150.2	0.01804
0.376	0.33552	110.0	.01538	117	.45647	149.6	.01832
0.377	0.33644	109.3	.01545	117	.45903	149.0	.01860
0.378	0.33736	108.6	.01553	118	.46159	148.5	.01888
0.379	0.33828	108.0	.01560	118	.46415	147.9	.01916
0.380	0.33920	107.3	0.01568	119	9.46672	147.3	0.01944
0.381	0.34012	106.6	.01575	119	.46928	146.7	.01972
0.382	0.34104	106.0	.01583	119	.47184	146.1	.02000
0.383	0.34196	105.3	.01590	120	.47440	145.6	.02028
0.384	0.34288	104.6	.01598	120	.47696	145.0	.02056
0.385	0.34380	104.0	0.01605	121	9.47953	144.4	0.02084
0.386	0.34472	103.3	.01613	121	.48209	143.9	.02112
0.387	0.34564	102.6	.01620	121	.48465	143.3	.02140
0.388	0.34656	102.0	.01628	122	.48721	142.8	.02168
0.389	0.34748	101.3	.01635	122	.48977	142.2	.02196
0.390	0.34840	100.6	0.01643	123	9.49234	141.7	0.02224
0.391	0.34932	100.0	.01650	123	.49490	141.1	.02252
0.392	0.35024	99.3	.01658	123	.49746	140.6	.02280
0.393	0.35116	98.6	.01665	124	.49999	140.1	.02308
0.394	0.35208	98.0	.01673	124	.50255	139.5	.02336
0.395	0.35300	97.3	0.01680	125	9.50512	139.0	0.02364
0.396	0.35392	96.6	.01688	125	.50768	138.5	.02392
0.397	0.35484	96.0	.01695	125	.51024	138.0	.02420
0.398	0.35576	95.3	.01703	126	.51280	137.5	.02448
0.399	0.35668	94.6	.01710	126	.51536	137.0	.02476
0.400	0.35760	94.0	0.01718	127	9.51793	136.4	0.02504
$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.300	9.48362	149.1	0.01936	12.7	9.46140	130.1	0.53564
.301	.48510	148.6	.01938	12.7	.46572	135.0	.53448
.302	.48659	148.2	.01951	12.7	.46708	135.1	.53292
.303	.48807	147.7	.01964	12.8	.46843	135.1	.53157
.304	.48951	147.2	.01977	12.8	.46978	135.1	.53022
0.305	9.49101	146.8	0.01989	12.8	9.47112	135.0	0.52888
.306	.49248	146.3	.02002	12.9	.47245	135.1	.52755
.307	.49394	145.9	.02015	12.9	.47379	135.0	.52621
.308	.49540	145.4	.02028	13.0	.47511	135.1	.52486
.309	.49685	145.0	.02041	13.0	.47644	135.0	.52350
0.310	9.49830	144.6	0.02054	13.0	9.47775	134.5	0.52225
.311	.49971	144.1	.02067	13.1	.47907	134.0	.52093
.312	.50118	143.7	.02080	13.1	.48047	134.0	.51963
.313	.50261	143.3	.02094	13.2	.48186	134.1	.51832
.314	.50404	142.8	.02107	13.2	.48328	134.0	.51702
0.315	9.50547	142.4	0.02120	13.2	9.48467	129.2	0.51573
.316	.50689	142.0	.02133	13.3	.48605	133.7	.51444
.317	.50831	141.6	.02146	13.3	.48741	133.2	.51316
.318	.50972	141.1	.02160	13.4	.48878	132.8	.51188
.319	.51113	140.7	.02173	13.4	.49010	127.1	.51060
0.320	9.51254	140.3	0.02187	13.4	9.49067	126.0	0.50933
.321	.51394	139.9	.02200	13.5	.49203	126.1	.50808
.322	.51534	139.5	.02214	13.5	.49330	126.0	.50683
.323	.51673	139.1	.02227	13.6	.49457	125.5	.50554
.324	.51812	138.7	.02241	13.6	.49571	125.1	.50429
0.325	9.51950	138.3	0.02254	13.6	9.49666	124.7	0.50304
.326	.52088	137.9	.02268	13.7	.49820	124.2	.50180
.327	.52226	137.5	.02282	13.7	.49911	124.8	.50056
.328	.52363	137.1	.02295	13.8	.50008	124.1	.49932
.329	.52500	136.7	.02309	13.8	.50191	122.9	.49809
0.330	9.52637	136.3	0.02322	13.8	9.50314	123.5	0.49686
.331	.52773	135.9	.02337	13.9	.50436	123.1	.49564
.332	.52909	135.6	.02351	13.9	.50558	121.7	.49442
.333	.53044	135.2	.02365	14.0	.50679	121.3	.49321
.334	.53179	134.8	.02379	14.0	.50800	120.8	.49200
0.335	9.53314	134.5	0.02393	14.0	9.50921	120.1	0.49079
.336	.53448	134.1	.02407	14.1	.51041	120.0	.48959
.337	.53582	133.7	.02421	14.1	.51161	119.6	.48839
.338	.53715	133.3	.02435	14.1	.51281	119.2	.48719
.339	.53849	133.0	.02449	14.2	.51400	118.8	.48600
0.340	9.53981	132.6	0.02463	14.2	9.51518	118.4	0.48482
.341	.54114	132.3	.02478	14.3	.51636	118.0	.48364
.342	.54246	131.9	.02493	14.3	.51754	117.9	.48246
.343	.54378	131.5	.02506	14.3	.51872	117.2	.48128
.344	.54509	131.2	.02520	14.4	.51989	116.8	.48011
0.345	9.54640	130.8	0.02535	14.4	9.52105	116.1	0.47895
.346	.54771	130.5	.02549	14.5	.52221	116.0	.47779
.347	.54901	130.1	.02564	14.5	.52337	115.7	.47663
.348	.55031	129.8	.02578	14.5	.52453	115.1	.47547
.349	.55161	129.5	.02593	14.6	.52568	114.9	.47432
0.350	9.55290	129.1	0.02607	14.6	9.52683	114.5	0.47318
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.350	0.55200	120.1	0.02007	14.6	9.52682	11.45	0.47418
.351	.55110	120.3	.02022	14.6	.52797	11.41	.47203
.352	.55017	120.4	.02037	14.7	.52911	11.37	.47089
.353	.55026	120.5	.02051	14.7	.53024	11.34	.46976
.354	.55001	120.8	.02066	14.8	.53137	11.30	.46863
0.355	0.55031	120.4	0.02081	14.8	9.53250	11.26	0.46750
.356	.55050	120.1	.02096	14.8	.53363	11.23	.46637
.357	.55085	120.8	.02111	14.9	.53475	11.19	.46525
.358	.55112	120.5	.02126	14.9	.53588	11.15	.46414
.359	.55138	120.1	.02140	15.0	.53698	11.12	.46302
0.360	0.55164	125.8	0.02155	15.0	9.53809	110.8	0.46191
.361	.55000	125.5	.02270	15.0	.53919	110.5	.46081
.362	.55015	125.2	.02285	15.1	.54030	110.4	.45970
.363	.55010	124.8	.02301	15.1	.54140	110.7	.45860
.364	.55005	124.5	.02316	15.1	.54249	110.4	.45751
0.365	0.55180	124.2	0.02331	15.2	9.54358	109.0	0.45642
.366	.55113	123.9	.02346	15.2	.54467	108.7	.45533
.367	.55137	123.6	.02361	15.3	.54576	108.3	.45424
.368	.55161	123.3	.02377	15.3	.54684	108.0	.45316
.369	.55184	123.0	.02392	15.3	.54792	107.7	.45208
0.370	0.55207	122.7	0.02407	15.4	9.54899	107.3	0.45101
.371	.55220	122.4	.02423	15.4	.55006	107.0	.44994
.372	.55051	122.1	.02438	15.4	.55113	106.6	.44887
.373	.55173	121.8	.02454	15.5	.55220	106.3	.44780
.374	.55295	121.5	.02469	15.5	.55326	106.0	.44674
0.375	0.55316	121.2	0.02485	15.6	9.55432	105.6	0.44568
.376	.55347	120.9	.02500	15.6	.55537	105.3	.44463
.377	.55368	120.6	.02515	15.6	.55642	105.0	.44358
.378	.55379	120.3	.02531	15.7	.55747	104.6	.44253
.379	.55387	120.0	.02547	15.7	.55850	104.3	.44148
0.380	0.55410	119.7	0.02563	15.8	9.55956	104.0	0.44044
.381	.55418	119.5	.02579	15.8	.56059	103.7	.43941
.382	.55457	119.2	.02595	15.8	.56163	103.3	.43837
.383	.55477	118.9	.02610	15.9	.56266	103.0	.43734
.384	.55495	118.6	.02625	15.9	.56369	102.7	.43631
0.385	0.55614	118.3	0.02641	15.9	9.56472	102.4	0.43528
.386	.55644	118.0	.02658	16.0	.56574	102.1	.43426
.387	.55650	117.8	.02674	16.0	.56676	101.8	.43324
.388	.55697	117.5	.02690	16.1	.56777	101.4	.43223
.389	.55685	117.2	.02705	16.1	.56879	101.1	.43121
0.390	0.56020	116.9	0.02722	16.1	9.56980	100.8	0.43020
.391	.60319	116.7	.02738	16.2	.57080	100.5	.42920
.392	.60135	116.4	.02755	16.2	.57181	100.2	.42819
.393	.60551	116.1	.02771	16.2	.57281	99.9	.42719
.394	.60608	115.9	.02787	16.3	.57380	99.6	.42620
0.395	0.60781	115.6	0.02803	16.3	9.57480	99.3	0.42520
.396	.60899	115.1	.02820	16.4	.57579	99.0	.42421
.397	.61014	115.1	.02836	16.4	.57678	98.7	.42322
.398	.61129	114.8	.02853	16.4	.57776	98.4	.42224
.399	.61244	114.6	.02869	16.5	.57875	98.1	.42125
0.400	0.61358	114.3	0.02885	16.5	9.57973	97.8	0.42027
u	log tan gd u	$\omega F_u'$	log sec gd u	$\omega F_u'$	log tan gd u	$\omega F_u'$	log sec gd u

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.400	9.61358	114.3	0.03385	16.5	9.57973	97.8	0.430.27
.401	.61472	114.0	.03402	16.5	.58070	97.5	.419.30
.402	.61585	113.8	.03419	16.6	.58168	97.4	.418.32
.403	.61700	113.5	.03435	16.6	.58265	97.0	.417.35
.404	.61813	113.3	.03452	16.6	.58361	96.6	.416.39
0.405	9.61926	113.0	0.03468	16.7	9.58458	96.3	0.415.42
.406	.62039	112.8	.03485	16.7	.58554	96.1	.414.46
.407	.62152	112.5	.03502	16.8	.58650	95.8	.413.50
.408	.62264	112.3	.03519	16.8	.58746	95.5	.412.54
.409	.62376	112.0	.03535	16.8	.58841	95.2	.411.59
0.410	9.62488	111.8	0.03552	16.9	9.58936	94.9	0.410.61
.411	.62599	111.6	.03569	16.9	.59031	94.6	.409.66
.412	.62711	111.3	.03585	16.9	.59125	94.4	.408.75
.413	.62823	111.1	.03603	17.0	.59220	94.1	.407.80
.414	.62934	110.8	.03620	17.0	.59314	93.8	.406.86
0.415	9.63044	110.6	0.03637	17.1	9.59407	93.5	0.405.93
.416	.63155	110.4	.03654	17.1	.59501	93.3	.405.00
.417	.63265	110.1	.03671	17.1	.59594	93.0	.404.06
.418	.63375	109.9	.03688	17.2	.59687	92.7	.403.13
.419	.63485	109.6	.03706	17.2	.59779	92.4	.402.21
0.420	9.63594	109.4	0.03723	17.2	9.59871	92.2	0.401.29
.421	.63704	109.2	.03740	17.3	.59963	91.9	.400.37
.422	.63813	109.0	.03757	17.3	.60055	91.6	.399.45
.423	.63922	108.7	.03775	17.3	.60147	91.4	.398.53
.424	.64030	108.5	.03792	17.4	.60238	91.1	.397.62
0.425	9.64139	108.3	0.03810	17.4	9.60329	90.8	0.396.71
.426	.64247	108.0	.03827	17.5	.60420	90.6	.395.80
.427	.64355	107.8	.03844	17.5	.60510	90.3	.394.90
.428	.64462	107.6	.03862	17.5	.60600	90.1	.394.00
.429	.64570	107.4	.03880	17.6	.60690	89.8	.393.10
0.430	9.64677	107.1	0.03897	17.6	9.60780	89.6	0.392.20
.431	.64784	106.9	.03915	17.6	.60869	89.3	.391.31
.432	.64891	106.7	.03932	17.7	.60959	89.0	.390.41
.433	.64997	106.5	.03950	17.7	.61047	88.8	.389.53
.434	.65104	106.3	.03968	17.7	.61136	88.5	.388.64
0.435	9.65210	106.0	0.03985	17.8	9.61224	88.3	0.387.76
.436	.65316	105.8	.04003	17.8	.61313	88.0	.386.87
.437	.65422	105.6	.04021	17.9	.61401	87.8	.385.99
.438	.65527	105.4	.04039	17.9	.61488	87.5	.385.12
.439	.65633	105.2	.04057	17.9	.61576	87.3	.384.24
0.440	9.65738	105.0	0.04075	18.0	9.61663	87.0	0.383.37
.441	.65843	104.8	.04093	18.0	.61750	86.8	.382.50
.442	.65947	104.6	.04111	18.0	.61836	86.5	.381.64
.443	.66052	104.4	.04129	18.1	.61923	86.3	.380.77
.444	.66156	104.2	.04147	18.1	.62009	86.1	.379.91
0.445	9.66260	104.0	0.04165	18.1	9.62095	85.8	0.379.05
.446	.66364	103.7	.04183	18.2	.62180	85.6	.378.20
.447	.66468	103.5	.04202	18.2	.62266	85.3	.377.34
.448	.66571	103.3	.04220	18.3	.62351	85.1	.376.49
.449	.66674	103.1	.04238	18.3	.62436	84.9	.375.64
0.450	9.66777	102.9	0.04256	18.3	9.62521	84.6	0.374.79
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\infty F_2'$	$\log \cosh u$	$\infty F_2'$	$\log \tanh u$	$\infty F_2'$	$\log \coth u$
0.430	0.67777	102.0	0.01256	18.3	9.62521	81.6	0.37479
.431	.67780	102.2	.01275	18.4	.62605	81.4	.37395
.432	.67783	102.5	.01293	18.4	.62690	81.1	.37310
.433	.67785	102.8	.01312	18.4	.62774	81.0	.37226
.434	.67787	103.1	.01330	18.5	.62857	81.7	.37143
0.435	0.67789	101.0	0.01348	18.5	9.62941	83.4	0.37059
.436	.67791	101.3	.01367	18.5	.63024	83.2	.36976
.437	.67793	101.6	.01384	18.6	.63107	83.0	.36893
.438	.67794	101.9	.01401	18.6	.63190	82.8	.36810
.439	.67796	101.2	.01418	18.6	.63273	82.5	.36727
0.440	0.67797	101.0	0.01431	18.7	9.63355	84.3	0.36645
.441	.67798	100.3	.01446	18.7	.63438	84.1	.36562
.442	.67799	100.6	.01470	18.7	.63519	81.8	.36481
.443	.67800	100.9	.01483	18.8	.63601	81.6	.36399
.444	.67801	100.2	.01516	18.8	.63683	81.4	.36317
0.445	0.67802	100.0	0.01535	18.9	9.63764	81.2	0.36236
.446	.67803	99.3	.01554	18.9	.63845	81.0	.36155
.447	.67804	99.7	.01573	18.9	.63926	80.7	.36074
.448	.67805	99.5	.01592	19.0	.64007	80.5	.35993
.449	.67806	99.8	.01611	19.0	.64087	80.3	.35913
0.450	0.67807	99.4	0.01630	19.0	9.64167	80.1	0.35833
.471	.67807	98.0	.01649	19.1	.64247	79.9	.35753
.472	.67808	98.7	.01668	19.1	.64327	79.6	.35673
.473	.67809	98.6	.01687	19.1	.64406	79.4	.35594
.474	.67810	98.1	.01706	19.2	.64486	79.2	.35514
0.475	0.67810	98.2	0.01726	19.2	9.64565	79.0	0.35435
.476	.67811	98.0	.01745	19.2	.64644	78.8	.35356
.477	.67812	97.3	.01764	19.1	.64723	78.6	.35278
.478	.67813	97.7	.01783	19.3	.64801	78.4	.35199
.479	.67814	97.5	.01803	19.1	.64879	78.2	.35121
0.480	0.67814	97.4	0.01822	19.4	9.64957	77.9	0.35043
.481	.67815	97.1	.01841	19.4	.65035	77.7	.34965
.482	.67816	97.0	.01861	19.4	.65113	77.5	.34887
.483	.67817	96.8	.01881	19.5	.65190	77.3	.34810
.484	.67817	96.6	.01901	19.5	.65267	77.1	.34733
0.485	0.67818	96.5	0.01910	19.6	9.65344	76.9	0.34656
.486	.67819	96.3	.01930	19.6	.65421	76.7	.34579
.487	.67820	96.1	.01950	19.6	.65498	76.5	.34502
.488	.67821	95.9	.01970	19.7	.65574	76.3	.34426
.489	.67822	95.8	.01993	19.7	.65650	76.1	.34350
0.490	0.67822	95.6	0.02013	19.7	9.65726	75.9	0.34274
.491	.67823	95.1	.02032	19.8	.65802	75.7	.34198
.492	.67824	95.3	.02052	19.8	.65878	75.5	.34122
.493	.67825	95.1	.02072	19.8	.65953	75.3	.34047
.494	.67826	95.0	.02092	19.9	.66028	75.1	.33972
0.495	0.67826	94.8	0.02112	19.9	9.66103	74.9	0.33897
.496	.67827	94.6	.02132	19.9	.66178	74.7	.33822
.497	.67828	94.5	.02156	20.0	.66253	74.5	.33747
.498	.67829	94.3	.02176	20.0	.66327	74.3	.33673
.499	.67830	94.1	.02196	20.0	.66401	74.1	.33598
0.500	0.67830	94.0	0.02217	20.1	9.66475	73.9	0.33525
$u$	$\log \sinh u$	$\infty F_2'$	$\log \cosh u$	$\infty F_2'$	$\log \tanh u$	$\infty F_2'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
0.500	9.71692	94.0	0.05217	20.1	9.66475	73.9	0.33545
.501	.71785	93.8	.05237	20.1	.66540	73.7	.33451
.502	.71879	93.7	.05257	20.1	.66623	73.5	.33377
.503	.71973	93.5	.05277	20.2	.66696	73.3	.33304
.504	.72066	93.3	.05297	20.2	.66769	73.1	.33231
0.505	9.72160	93.2	0.05317	20.2	9.66842	72.9	0.33158
.506	.72253	93.0	.05338	20.3	.66915	72.8	.33085
.507	.72346	92.9	.05358	20.3	.66988	72.6	.33012
.508	.72438	92.7	.05378	20.3	.67060	72.4	.32940
.509	.72531	92.6	.05399	20.4	.67133	72.2	.32867
0.510	9.72624	92.4	0.05419	20.4	9.67205	72.0	0.32795
.511	.72716	92.3	.05439	20.4	.67277	71.8	.32723
.512	.72808	92.1	.05460	20.5	.67348	71.6	.32652
.513	.72900	92.0	.05480	20.5	.67420	71.5	.32580
.514	.72992	91.8	.05501	20.5	.67491	71.3	.32509
0.515	9.73084	91.7	0.05521	20.6	9.67562	71.1	0.32438
.516	.73175	91.5	.05542	20.6	.67633	70.9	.32367
.517	.73267	91.4	.05563	20.6	.67704	70.7	.32296
.518	.73358	91.2	.05583	20.7	.67775	70.5	.32225
.519	.73449	91.1	.05604	20.7	.67845	70.3	.32155
0.520	9.73540	90.9	0.05625	20.7	9.67916	70.2	0.32084
.521	.73631	90.8	.05645	20.8	.67985	70.0	.32014
.522	.73722	90.6	.05666	20.8	.68056	69.8	.31944
.523	.73812	90.5	.05687	20.8	.68125	69.6	.31875
.524	.73903	90.3	.05708	20.9	.68195	69.5	.31805
0.525	9.73993	90.2	0.05729	20.9	9.68264	69.3	0.31736
.526	.74083	90.0	.05750	20.9	.68333	69.1	.31667
.527	.74173	89.9	.05771	21.0	.68402	68.9	.31598
.528	.74263	89.8	.05792	21.0	.68471	68.7	.31529
.529	.74353	89.6	.05813	21.0	.68540	68.6	.31460
0.530	9.74442	89.5	0.05834	21.1	9.68608	68.4	0.31392
.531	.74532	89.3	.05855	21.1	.68677	68.2	.31323
.532	.74621	89.2	.05876	21.1	.68745	68.0	.31255
.533	.74710	89.1	.05897	21.2	.68813	67.9	.31187
.534	.74799	88.9	.05918	21.2	.68880	67.7	.31120
0.535	9.74898	88.8	0.05940	21.2	9.68948	67.5	0.31054
.536	.74976	88.6	.05961	21.3	.69016	67.4	.30984
.537	.75065	88.5	.05982	21.3	.69083	67.2	.30917
.538	.75153	88.4	.06004	21.3	.69150	67.0	.30850
.539	.75242	88.2	.06025	21.4	.69217	66.9	.30783
0.540	9.75330	88.1	0.06046	21.4	9.69284	66.7	0.30716
.541	.75418	88.0	.06068	21.4	.69350	66.5	.30650
.542	.75506	87.8	.06089	21.5	.69417	66.3	.30583
.543	.75594	87.7	.06111	21.5	.69483	66.2	.30517
.544	.75681	87.6	.06132	21.5	.69549	66.0	.30451
0.545	9.75769	87.4	0.06154	21.6	9.69615	65.9	0.30385
.546	.75856	87.3	.06175	21.6	.69681	65.7	.30319
.547	.75943	87.2	.06197	21.6	.69746	65.5	.30254
.548	.76030	87.0	.06219	21.7	.69812	65.4	.30188
.549	.76117	86.9	.06240	21.7	.69877	65.2	.30123
0.550	9.76204	86.8	0.06262	21.7	9.69942	65.0	0.30058
$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.550	0.70504	86.8	0.06562	21.7	9.68942	65.0	0.30058
.551	.70501	86.6	.06581	21.8	.70007	64.9	.30093
.552	.70497	86.5	.06600	21.8	.70072	64.7	.30128
.553	.70494	86.4	.06619	21.8	.70137	64.5	.30163
.554	.70490	86.3	.06639	21.9	.70201	64.4	.30199
0.555	0.70486	86.1	0.06659	21.9	0.70265	64.2	0.30235
.556	.70483	86.0	.06678	22.0	.70329	64.1	.30271
.557	.70479	85.9	.06698	22.0	.70393	63.9	.30307
.558	.70476	85.7	.06717	22.0	.70457	63.7	.30343
.559	.70472	85.6	.06737	22.0	.70521	63.6	.30379
0.560	0.70468	85.5	0.06757	22.1	0.70584	63.4	0.30416
.561	.70465	85.4	.06776	22.1	.70648	63.3	.30452
.562	.70461	85.3	.06796	22.1	.70711	63.1	.30489
.563	.70458	85.1	.06815	22.2	.70774	63.0	.30526
.564	.70454	85.0	.06835	22.2	.70837	62.8	.30563
0.565	0.70450	84.9	0.06855	22.2	0.70900	62.7	.30600
.566	.70447	84.8	.06874	22.3	.70962	62.5	.30638
.567	.70443	84.6	.06894	22.3	.71025	62.3	.30675
.568	.70440	84.5	.06913	22.3	.71087	62.2	.30713
.569	.70436	84.4	.06933	22.3	.71149	62.0	.30751
0.570	0.70432	84.3	0.06953	22.4	0.71211	61.9	0.30789
.571	.70429	84.2	.06972	22.4	.71273	61.7	.30827
.572	.70425	84.0	.06992	22.4	.71334	61.6	.30866
.573	.70422	83.9	.07011	22.5	.71395	61.4	.30904
.574	.70418	83.8	.07031	22.5	.71457	61.3	.30943
0.575	0.70414	83.7	0.07051	22.5	0.71519	61.1	0.30981
.576	.70411	83.6	.07070	22.6	.71580	61.0	.31020
.577	.70407	83.4	.07090	22.6	.71641	60.8	.31059
.578	.70404	83.3	.07109	22.6	.71701	60.7	.31099
.579	.70400	83.2	.07129	22.7	.71762	60.5	.31138
0.580	0.70396	83.1	0.07149	22.7	0.71822	60.4	0.31178
.581	.70393	83.0	.07168	22.7	.71883	60.2	.31217
.582	.70389	82.9	.07188	22.8	.71943	60.1	.31257
.583	.70386	82.7	.07207	22.8	.72003	60.0	.31297
.584	.70382	82.6	.07227	22.8	.72063	59.8	.31337
0.585	0.70378	82.5	0.07247	22.9	0.72123	59.7	0.31377
.586	.70375	82.4	.07266	22.9	.72182	59.5	.31418
.587	.70371	82.3	.07286	22.9	.72242	59.4	.31458
.588	.70368	82.2	.07305	23.0	.72301	59.2	.31499
.589	.70364	82.1	.07325	23.0	.72360	59.1	.31539
0.590	0.70360	82.0	0.07345	23.0	0.72419	58.9	0.31581
.591	.70357	81.8	.07364	23.0	.72478	58.8	.31621
.592	.70353	81.7	.07384	23.1	.72537	58.7	.31663
.593	.70350	81.6	.07403	23.1	.72595	58.5	.31705
.594	.70346	81.5	.07423	23.1	.72654	58.4	.31746
0.595	0.70342	81.4	0.07443	23.2	0.72712	58.2	0.31788
.596	.70339	81.3	.07462	23.2	.72770	58.1	.31830
.597	.70335	81.2	.07482	23.2	.72828	58.0	.31872
.598	.70332	81.1	.07501	23.3	.72886	57.8	.31914
.599	.70328	81.0	.07521	23.3	.72944	57.7	.31956
0.600	0.70324	80.9	0.07541	23.3	0.73001	57.5	0.32000
u	log tan ud u	$\omega F_0'$	log sec ud u	$\omega F_0'$	log sin ud u	$\omega F_0'$	log csc ud u



# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.600	9.80370	80.0	0.07389	23.1	0.73000	57.5	0.26000
.601	.80471	80.1	.07412	23.1	.73050	57.4	.26011
.602	.80552	80.2	.07436	23.1	.73100	57.3	.26021
.603	.80632	80.3	.07459	23.1	.73150	57.2	.26032
.604	.80713	80.4	.07482	23.1	.73200	57.0	.26042
0.605	9.80793	80.5	0.07506	23.5	0.73250	56.9	0.26053
.606	.80874	80.6	.07529	23.5	.73300	56.7	.26063
.607	.80954	80.7	.07553	23.5	.73350	56.6	.26074
.608	.81034	80.8	.07577	23.6	.73400	56.5	.26084
.609	.81114	79.9	.07600	23.6	.73450	56.3	.26095
0.610	9.81194	79.8	0.07624	23.6	0.73500	56.2	0.26105
.611	.81273	79.7	.07647	23.7	.73550	56.0	.26116
.612	.81353	79.6	.07671	23.7	.73600	55.9	.26126
.613	.81433	79.5	.07695	23.7	.73650	55.8	.26137
.614	.81512	79.4	.07718	23.8	.73700	55.7	.26147
0.615	9.81591	79.3	0.07742	23.8	0.73750	55.5	0.26158
.616	.81671	79.2	.07765	23.8	.73800	55.4	.26168
.617	.81750	79.1	.07789	23.8	.73850	55.3	.26179
.618	.81829	79.0	.07812	23.9	.73900	55.1	.26189
.619	.81908	78.9	.07836	23.9	.73950	55.0	.26200
0.620	9.81987	78.8	0.07860	23.9	0.74000	54.9	0.26210
.621	.82065	78.7	.07883	24.0	.74050	54.7	.26221
.622	.82144	78.6	.07907	24.0	.74100	54.6	.26231
.623	.82223	78.5	.07930	24.0	.74150	54.5	.26242
.624	.82301	78.4	.07954	24.1	.74200	54.3	.26252
0.625	9.82380	78.3	0.07978	24.1	0.74250	54.2	0.26263
.626	.82458	78.2	.08001	24.1	.74300	54.1	.26273
.627	.82536	78.1	.08025	24.1	.74350	54.0	.26284
.628	.82614	78.0	.08048	24.2	.74400	53.8	.26294
.629	.82692	77.9	.08072	24.2	.74450	53.7	.26305
0.630	9.82770	77.8	0.08096	24.2	0.74500	53.6	0.26315
.631	.82848	77.7	.08119	24.2	.74550	53.5	.26326
.632	.82925	77.6	.08143	24.3	.74600	53.4	.26336
.633	.83003	77.5	.08166	24.3	.74650	53.3	.26347
.634	.83080	77.4	.08190	24.4	.74700	53.1	.26357
0.635	9.83158	77.3	0.08213	24.4	0.74750	53.0	0.26368
.636	.83235	77.2	.08237	24.4	.74800	52.8	.26378
.637	.83313	77.1	.08260	24.4	.74850	52.7	.26389
.638	.83389	77.0	.08284	24.5	.74900	52.6	.26400
.639	.83466	77.0	.08307	24.5	.74950	52.5	.26410
0.640	9.83543	76.9	0.08331	24.5	0.75000	52.3	0.26421
.641	.83620	76.8	.08354	24.6	.75050	52.2	.26431
.642	.83697	76.7	.08378	24.6	.75100	52.1	.26442
.643	.83774	76.6	.08401	24.6	.75150	52.0	.26452
.644	.83850	76.5	.08425	24.7	.75200	51.9	.26463
0.645	9.83927	76.4	0.08448	24.7	0.75250	51.7	0.26473
.646	.84003	76.3	.08472	24.7	.75300	51.6	.26484
.647	.84079	76.2	.08495	24.7	.75350	51.5	.26494
.648	.84155	76.1	.08519	24.8	.75400	51.4	.26505
.649	.84232	76.1	.08542	24.8	.75450	51.3	.26515
0.650	9.84308	76.0	0.08566	24.8	0.75500	51.1	0.26526
u	log tan gd u	$\omega F_u'$	log sec gd u	$\omega F_u'$	log sin gd u	$\omega F_u'$	log cos gd u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
0.050	0.81308	70.0	0.08503	24.8	0.72715	51.1	0.24385
.051	.81383	70.0	.08508	24.9	.72760	51.0	.24431
.052	.81459	70.0	.08513	24.9	.72807	50.9	.24473
.053	.81535	70.0	.08518	24.9	.72852	50.8	.24513
.054	.81611	70.0	.08523	24.9	.72898	50.7	.24552
0.055	0.81685	70.0	0.08528	25.0	0.72944	50.6	0.24591
.056	.81762	70.0	.08533	25.0	.72990	50.5	.24631
.057	.81837	70.0	.08538	25.0	.73036	50.4	.24670
.058	.81912	70.0	.08543	25.1	.73082	50.3	.24709
.059	.81988	70.0	.08548	25.1	.73128	50.2	.24748
0.060	0.82063	70.0	0.08553	25.1	0.73174	50.1	0.24787
.061	.82138	70.0	.08558	25.1	.73220	50.0	.24827
.062	.82213	70.0	.08563	25.2	.73266	49.9	.24866
.063	.82288	70.0	.08568	25.2	.73312	49.8	.24905
.064	.82363	70.0	.08573	25.2	.73358	49.7	.24944
0.065	0.82438	70.0	0.08578	25.3	0.73404	49.6	0.24983
.066	.82513	70.0	.08583	25.3	.73450	49.5	.25023
.067	.82588	70.0	.08588	25.3	.73496	49.4	.25062
.068	.82663	70.0	.08593	25.4	.73542	49.3	.25101
.069	.82738	70.0	.08598	25.4	.73588	49.2	.25140
0.070	0.82813	70.0	0.08603	25.4	0.73634	49.1	0.25179
.071	.82888	70.0	.08608	25.4	.73680	49.0	.25218
.072	.82963	70.0	.08613	25.5	.73726	48.9	.25257
.073	.83038	70.0	.08618	25.5	.73772	48.8	.25296
.074	.83113	70.0	.08623	25.5	.73818	48.7	.25335
0.075	0.83188	70.0	0.08628	25.5	0.73864	48.6	0.25374
.076	.83263	70.0	.08633	25.6	.73910	48.5	.25413
.077	.83338	70.0	.08638	25.6	.73956	48.4	.25452
.078	.83413	70.0	.08643	25.6	.74002	48.3	.25491
.079	.83488	70.0	.08648	25.7	.74048	48.2	.25530
0.080	0.83563	70.0	0.08653	25.7	0.74094	48.1	0.25569
.081	.83638	70.0	.08658	25.7	.74140	48.0	.25608
.082	.83713	70.0	.08663	25.7	.74186	47.9	.25647
.083	.83788	70.0	.08668	25.8	.74232	47.8	.25686
.084	.83863	70.0	.08673	25.8	.74278	47.7	.25725
0.085	0.83938	70.0	0.08678	25.8	0.74324	47.6	0.25764
.086	.84013	70.0	.08683	25.9	.74370	47.5	.25803
.087	.84088	70.0	.08688	25.9	.74416	47.4	.25842
.088	.84163	70.0	.08693	25.9	.74462	47.3	.25881
.089	.84238	70.0	.08698	25.9	.74508	47.2	.25920
0.090	0.84313	70.0	0.08703	26.0	0.74554	47.1	0.25959
.091	.84388	70.0	.08708	26.0	.74600	47.0	.25998
.092	.84463	70.0	.08713	26.0	.74646	46.9	.26037
.093	.84538	70.0	.08718	26.1	.74692	46.8	.26076
.094	.84613	70.0	.08723	26.1	.74738	46.7	.26115
0.095	0.84688	70.0	0.08728	26.1	0.74784	46.6	0.26154
.096	.84763	70.0	.08733	26.2	.74830	46.5	.26193
.097	.84838	70.0	.08738	26.2	.74876	46.4	.26232
.098	.84913	70.0	.08743	26.2	.74922	46.3	.26271
.099	.84988	70.0	.08748	26.3	.74968	46.2	.26310
0.100	0.85063	70.0	0.08753	26.3	0.75014	46.1	0.26349
.101	.85138	70.0	.08758	26.3	.75060	46.0	.26388
.102	.85213	70.0	.08763	26.4	.75106	45.9	.26427
.103	.85288	70.0	.08768	26.4	.75152	45.8	.26466
.104	.85363	70.0	.08773	26.4	.75198	45.7	.26505
0.105	0.85438	70.0	0.08778	26.5	0.75244	45.6	0.26544
.106	.85513	70.0	.08783	26.5	.75290	45.5	.26583
.107	.85588	70.0	.08788	26.5	.75336	45.4	.26622
.108	.85663	70.0	.08793	26.6	.75382	45.3	.26661
.109	.85738	70.0	.08798	26.6	.75428	45.2	.26700
.110	.85813	70.0	.08803	26.6	.75474	45.1	.26739
0.111	0.85888	70.0	0.08808	26.7	0.75520	45.0	0.26778
.112	.85963	70.0	.08813	26.7	.75566	44.9	.26817
.113	.86038	70.0	.08818	26.7	.75612	44.8	.26856
.114	.86113	70.0	.08823	26.8	.75658	44.7	.26895
.115	.86188	70.0	.08828	26.8	.75704	44.6	.26934
0.116	0.86263	70.0	0.08833	26.8	0.75750	44.5	0.26973
.117	.86338	70.0	.08838	26.9	.75796	44.4	.27012
.118	.86413	70.0	.08843	26.9	.75842	44.3	.27051
.119	.86488	70.0	.08848	26.9	.75888	44.2	.27090
0.120	0.86563	70.0	0.08853	27.0	0.75934	44.1	0.27129
.121	.86638	70.0	.08858	27.0	.75980	44.0	.27168
.122	.86713	70.0	.08863	27.0	.76026	43.9	.27207
.123	.86788	70.0	.08868	27.1	.76072	43.8	.27246
.124	.86863	70.0	.08873	27.1	.76118	43.7	.27285
0.125	0.86938	70.0	0.08878	27.1	0.76164	43.6	0.27324
.126	.87013	70.0	.08883	27.2	.76210	43.5	.27363
.127	.87088	70.0	.08888	27.2	.76256	43.4	.27402
.128	.87163	70.0	.08893	27.2	.76302	43.3	.27441
.129	.87238	70.0	.08898	27.3	.76348	43.2	.27480
.130	.87313	70.0	.08903	27.3	.76394	43.1	.27519
0.131	0.87388	70.0	0.08908	27.3	0.76440	43.0	0.27558
.132	.87463	70.0	.08913	27.4	.76486	42.9	.27597
.133	.87538	70.0	.08918	27.4	.76532	42.8	.27636
.134	.87613	70.0	.08923	27.4	.76578	42.7	.27675
.135	.87688	70.0	.08928	27.5	.76624	42.6	.27714
0.136	0.87763	70.0	0.08933	27.5	0.76670	42.5	0.27753
.137	.87838	70.0	.08938	27.5	.76716	42.4	.27792
.138	.87913	70.0	.08943	27.6	.76762	42.3	.27831
.139	.87988	70.0	.08948	27.6	.76808	42.2	.27870
.140	.88063	70.0	.08953	27.6	.76854	42.1	.27909
0.141	0.88138	70.0	0.08958	27.7	0.76900	42.0	0.27948
.142	.88213	70.0	.08963	27.7	.76946	41.9	.27987
.143	.88288	70.0	.08968	27.7	.76992	41.8	.28026
.144	.88363	70.0	.08973	27.8	.77038	41.7	.28065
.145	.88438	70.0	.08978	27.8	.77084	41.6	.28104
0.146	0.88513	70.0	0.08983	27.8	0.77130	41.5	0.28143
.147	.88588	70.0	.08988	27.9	.77176	41.4	.28182
.148	.88663	70.0	.08993	27.9	.77222	41.3	.28221
.149	.88738	70.0	.08998	27.9	.77268	41.2	.28260
.150	.88813	70.0	.09003	28.0	.77314	41.1	.28299
0.151	0.88888	70.0	0.09008	28.0	0.77360	41.0	0.28338
.152	.88963	70.0	.09013	28.0	.77406	40.9	.28377
.153	.89038	70.0	.09018	28.1	.77452	40.8	.28416
.154	.89113	70.0	.09023	28.1	.77498	40.7	.28455
.155	.89188	70.0	.09028	28.1	.77544	40.6	.28494
0.156	0.89263	70.0	0.09033	28.2	0.77590	40.5	0.28533
.157	.89338	70.0	.09038	28.2	.77636	40.4	.28572
.158	.89413	70.0	.09043	28.2	.77682	40.3	.28611
.159	.89488	70.0	.09048	28.3	.77728	40.2	.28650
.160	.89563	70.0	.09053	28.3	.77774	40.1	.28689
0.161	0.89638	70.0	0.09058	28.3	0.77820	40.0	0.28728
.162	.89713	70.0	.09063	28.4	.77866	39.9	.28767
.163	.89788	70.0	.09068	28.4	.77912	39.8	.28806
.164	.89863	70.0	.09073	28.4	.77958	39.7	.28845
.165	.89938	70.0	.09078	28.5	.78004	39.6	.28884
0.166	0.90013	70.0	0.09083	28.5	0.78050	39.5	0.28923
.167	.90088	70.0	.09088	28.5	.78096	39.4	.28962
.168	.90163	70.0	.09093	28.6	.78142	39.3	.28999
.169	.90238	70.0	.09098	28.6	.78188	39.2	.29038
.170	.90313	70.0	.09103	28.6	.78234	39.1	.29077
0.171	0.90388	70.0	0.09108	28.7	0.78280	39.0	0.29116
.172	.90463	70.0	.09113	28.7	.78326	38.9	.29155
.173	.90538	70.0	.09118	28.7	.78372	38.8	.29194
.174	.90613	70.0	.09123	28.8	.78418	38.7	.29233
.175	.90688	70.0	.09128	28.8	.78464	38.6	.29272
0.176	0.90763	70.0	0.09133	28.8	0.78510	38.5	0.29311
.177	.90838	70.0	.09138	28.9	.78556	38.4	.29350
.178	.90913	70.0	.09143	28.9	.78602	38.3	.29389
.179	.90988	70.0	.09148	28.9	.78648	38.2	.29428
.180	.91063	70.0	.09153	29.0	.78694	38.1	.29467
0.181	0.91138	70.0	0.09158	29.0	0.78740	38.0	0.29506
.182	.91213	70.0	.09163	29.0	.78786	37.9	.29545
.183	.91288	70.0	.09168	29.1	.78832	37.8	.29584
.184	.91363	70.0	.09173	29.1	.78878	37.7	.29623
.185	.91438	70.0	.09178	29.1	.78924	37.6	.29662
0.186	0.91513	70.0	0.09183	29.2	0.78970	37.5	0.29701
.187	.91588	70.0	.09188	29.2	.79016	37.4	.29740
.188	.91663	70.0	.09193	29.2	.79062	37.3	.29779
.189	.91738	70.0	.09198	29.3	.79108	37.2	.29818
.190	.91813	70.0	.09203	29.3	.79154	37.1	.29857
0.191	0.91888	70.0	0.09208	29.3	0.79200	37.0	0.29896
.192	.91963	70.0	.09213	29.4	.79246	36.9	.29935
.193	.92038	70.0	.09218	29.4	.79292	36.8	.29974
.194	.92113	70.0	.09223	29.4	.79338	36.7	.30013
.195	.92188	70.0	.09228	29.5	.79384	36.6	.30052
0.196	0.92263	70.0	0.09233	29.5	0.79430	36.5	0.30091
.197	.92338	70.0	.09238	29.5	.79476	36.4	.30130
.198	.92413	70.0	.09243	29.6	.79522	36.3	.30169
.1							

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_1'$	log tanh u	$\omega F_2'$	log coth u
0.700	9.83000	71.9	0.06370	26.2	9.78150	45.0	0.24320
.701	.83072	71.8	.06393	26.3	.78177	45.5	.24354
.702	.83144	71.7	.06416	26.3	.78204	45.4	.24379
.703	.83216	71.6	.06439	26.3	.78230	45.3	.24404
.704	.83287	71.6	.06462	26.4	.78257	45.3	.24428
0.705	9.83359	71.5	0.10002	26.4	9.78357	45.1	0.24513
.706	.83430	71.4	.10028	26.4	.78402	45.0	.24508
.707	.83502	71.3	.10055	26.4	.78447	44.9	.24553
.708	.83573	71.3	.10081	26.5	.78492	44.8	.24598
.709	.83644	71.2	.10108	26.5	.78537	44.7	.24641
0.710	9.83715	71.1	0.10134	26.5	9.78583	44.6	0.24719
.711	.83785	71.0	.10161	26.5	.78628	44.5	.24754
.712	.83857	71.0	.10187	26.6	.78673	44.4	.24799
.713	.83928	70.9	.10214	26.6	.78718	44.3	.24844
.714	.83999	70.8	.10240	26.6	.78763	44.2	.24889
0.715	9.84070	70.8	0.10267	26.7	9.78809	44.1	0.24967
.716	.84141	70.7	.10294	26.7	.78854	44.0	.24963
.717	.84211	70.6	.10320	26.7	.78899	43.9	.25008
.718	.84282	70.5	.10347	26.7	.78944	43.8	.25053
.719	.84352	70.5	.10374	26.8	.78989	43.7	.25098
0.720	9.84423	70.4	0.10401	26.8	9.79034	43.6	0.25176
.721	.84493	70.3	.10427	26.8	.79079	43.5	.25221
.722	.84563	70.3	.10454	26.8	.79124	43.4	.25266
.723	.84634	70.2	.10481	26.9	.79169	43.3	.25311
.724	.84704	70.1	.10508	26.9	.79214	43.3	.25356
0.725	9.84774	70.0	0.10535	27.0	9.79259	43.1	0.25434
.726	.84844	70.0	.10562	27.0	.79304	43.0	.25479
.727	.84914	69.9	.10589	27.0	.79349	43.0	.25524
.728	.84984	69.8	.10616	27.0	.79394	43.8	.25569
.729	.85054	69.8	.10643	27.0	.79439	43.7	.25614
0.730	9.85123	69.7	0.10670	27.1	9.79484	43.6	0.25692
.731	.85193	69.6	.10697	27.1	.79529	43.5	.25737
.732	.85263	69.6	.10724	27.1	.79574	43.5	.25782
.733	.85332	69.5	.10751	27.1	.79619	43.4	.25827
.734	.85402	69.4	.10778	27.2	.79664	43.3	.25872
0.735	9.85471	69.4	0.10805	27.2	9.79709	43.2	0.25950
.736	.85540	69.3	.10833	27.2	.79754	43.1	.25995
.737	.85610	69.2	.10860	27.2	.79799	43.0	.26040
.738	.85679	69.2	.10887	27.3	.79844	43.0	.26085
.739	.85748	69.1	.10915	27.3	.79889	42.8	.26130
0.740	9.85817	69.0	0.10942	27.3	9.79934	42.7	0.26208
.741	.85885	69.0	.10969	27.3	.79979	42.6	.26253
.742	.85955	68.9	.10997	27.3	.80024	42.5	.26298
.743	.86024	68.8	.11024	27.4	.80069	42.4	.26343
.744	.86092	68.8	.11051	27.4	.80114	42.3	.26388
0.745	9.86161	68.7	0.11079	27.5	9.80159	42.1	0.26466
.746	.86230	68.6	.11105	27.5	.80204	42.1	.26511
.747	.86298	68.6	.11131	27.5	.80249	42.1	.26556
.748	.86367	68.5	.11158	27.5	.80294	42.0	.26601
.749	.86436	68.4	.11185	27.6	.80339	42.0	.26646
0.750	9.86501	68.4	0.11216	27.6	9.80384	41.8	0.26724
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_1'$	log sin gd u	$\omega F_2'$	log cos gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.750	0.91504	68.4	0.11216	27.6	9.80288	40.8	0.19712
.751	.91522	68.3	.11244	27.6	.80328	40.7	.19672
.752	.91541	68.2	.11272	27.6	.80369	40.6	.19631
.753	.91560	68.1	.11300	27.7	.80410	40.5	.19590
.754	.91577	68.1	.11327	27.7	.80450	40.4	.19550
0.755	0.91595	68.1	0.11355	27.7	9.80490	40.3	0.19510
.756	.91613	68.0	.11382	27.7	.80531	40.3	.19469
.757	.91631	67.9	.11410	27.8	.80571	40.2	.19429
.758	.91649	67.9	.11438	27.8	.80611	40.1	.19389
.759	.91667	67.8	.11465	27.8	.80651	40.0	.19349
0.760	0.91685	67.7	0.11493	27.8	9.80691	39.9	0.19309
.761	.91703	67.7	.11521	27.9	.80731	39.8	.19269
.762	.91721	67.6	.11549	27.9	.80771	39.7	.19229
.763	.91739	67.6	.11577	27.9	.80810	39.6	.19189
.764	.91757	67.5	.11605	27.9	.80850	39.6	.19150
0.765	0.91775	67.4	0.11633	28.0	9.80889	39.5	0.19111
.766	.91793	67.4	.11661	28.0	.80929	39.4	.19071
.767	.91811	67.3	.11689	28.0	.80968	39.3	.19031
.768	.91829	67.3	.11717	28.0	.81007	39.2	.18991
.769	.91847	67.2	.11745	28.1	.81047	39.1	.18951
0.770	0.91865	67.1	0.11773	28.1	9.81085	39.0	0.18911
.771	.91883	67.1	.11801	28.1	.81125	39.0	.18871
.772	.91901	67.0	.11829	28.1	.81164	38.9	.18831
.773	.91919	67.0	.11858	28.2	.81202	38.8	.18791
.774	.91937	66.9	.11885	28.2	.81241	38.7	.18751
0.775	0.91955	66.8	0.11913	28.2	9.81280	38.6	0.18720
.776	.91973	66.8	.11941	28.2	.81318	38.5	.18682
.777	.91991	66.7	.11970	28.3	.81357	38.4	.18643
.778	.92009	66.7	.11999	28.3	.81395	38.4	.18605
.779	.92027	66.6	.12027	28.3	.81434	38.3	.18566
0.780	0.92045	66.5	0.12055	28.3	9.81472	38.2	0.18528
.781	.92063	66.5	.12084	28.4	.81510	38.1	.18490
.782	.92081	66.4	.12112	28.4	.81548	38.0	.18452
.783	.92099	66.4	.12141	28.4	.81586	37.9	.18414
.784	.92117	66.3	.12169	28.4	.81624	37.9	.18376
0.785	0.92135	66.3	0.12197	28.5	9.81662	37.8	0.18338
.786	.92153	66.2	.12225	28.5	.81699	37.7	.18301
.787	.92171	66.1	.12254	28.5	.81737	37.6	.18263
.788	.92189	66.1	.12283	28.5	.81775	37.5	.18225
.789	.92207	66.0	.12312	28.6	.81812	37.4	.18188
0.790	0.92225	66.0	0.12340	28.6	9.81850	37.4	0.18150
.791	.92243	65.9	.12369	28.6	.81887	37.3	.18113
.792	.92261	65.8	.12397	28.6	.81924	37.2	.18076
.793	.92279	65.8	.12426	28.7	.81961	37.1	.18039
.794	.92297	65.7	.12455	28.7	.81998	37.0	.18002
0.795	0.92315	65.7	0.12483	28.7	9.82035	37.0	0.17965
.796	.92333	65.6	.12512	28.7	.82072	36.9	.17928
.797	.92351	65.6	.12541	28.8	.82109	36.8	.17891
.798	.92369	65.5	.12570	28.8	.82146	36.7	.17854
.799	.92387	65.5	.12598	28.8	.82183	36.6	.17817
0.800	0.92405	65.4	0.12627	28.8	9.82219	36.6	0.17781
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cose gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.830	9.94846	65.4	0.12627	28.8	9.82219	36.6	0.17781
.831	9.94912	65.3	.12656	28.9	.82255	36.5	.17744
.832	9.94977	65.3	.12685	28.9	.82292	36.4	.17708
.833	9.95042	65.2	.12714	28.9	.82329	36.3	.17671
.834	9.95108	65.2	.12743	28.9	.82365	36.2	.17635
0.835	9.95173	65.1	0.12772	29.0	9.82401	36.2	0.17599
.836	9.95238	65.1	.12801	29.0	.82437	36.1	.17563
.837	9.95303	65.0	.12830	29.0	.82473	36.0	.17527
.838	9.95368	65.0	.12859	29.0	.82509	35.9	.17491
.839	9.95433	64.9	.12888	29.1	.82545	35.9	.17455
0.840	9.95498	64.9	0.12917	29.1	9.82581	35.8	0.17419
.841	9.95563	64.8	.12946	29.1	.82617	35.7	.17383
.842	9.95627	64.8	.12975	29.1	.82652	35.6	.17348
.843	9.95692	64.7	.13004	29.2	.82688	35.5	.17312
.844	9.95757	64.6	.13033	29.2	.82723	35.5	.17277
0.845	9.95821	64.6	0.13063	29.2	9.82759	35.4	0.17241
.846	9.95885	64.5	.13092	29.2	.82794	35.3	.17206
.847	9.95950	64.5	.13121	29.2	.82829	35.2	.17171
.848	9.96015	64.4	.13150	29.3	.82865	35.2	.17135
.849	9.96079	64.4	.13180	29.3	.82900	35.1	.17100
0.850	9.96144	64.3	0.13209	29.3	9.82935	35.0	0.17065
.851	9.96208	64.3	.13238	29.3	.82970	34.9	.17030
.852	9.96272	64.2	.13268	29.4	.83005	34.9	.16995
.853	9.96336	64.2	.13297	29.4	.83040	34.8	.16960
.854	9.96401	64.1	.13326	29.4	.83074	34.7	.16926
0.855	9.96465	64.1	0.13356	29.4	9.83109	34.6	0.16891
.856	9.96529	64.0	.13385	29.5	.83144	34.6	.16856
.857	9.96593	64.0	.13415	29.5	.83178	34.5	.16822
.858	9.96657	63.9	.13444	29.5	.83213	34.4	.16787
.859	9.96721	63.9	.13474	29.5	.83247	34.3	.16753
0.860	9.96784	63.8	0.13503	29.6	9.83281	34.3	0.16719
.861	9.96848	63.8	.13533	29.6	.83316	34.2	.16684
.862	9.96912	63.7	.13562	29.6	.83350	34.1	.16650
.863	9.96976	63.7	.13592	29.6	.83384	34.0	.16616
.864	9.97039	63.6	.13622	29.6	.83418	34.0	.16582
0.865	9.97103	63.6	0.13651	29.7	9.83452	33.9	0.16548
.866	9.97167	63.5	.13681	29.7	.83486	33.8	.16514
.867	9.97230	63.5	.13711	29.7	.83520	33.8	.16481
.868	9.97293	63.4	.13740	29.7	.83553	33.7	.16447
.869	9.97357	63.4	.13770	29.8	.83587	33.6	.16413
0.870	9.97420	63.3	0.13800	29.8	9.83620	33.5	0.16380
.871	9.97484	63.3	.13830	29.8	.83654	33.5	.16346
.872	9.97547	63.2	.13859	29.8	.83687	33.4	.16313
.873	9.97610	63.2	.13889	29.9	.83721	33.3	.16279
.874	9.97673	63.1	.13919	29.9	.83754	33.3	.16246
0.875	9.97736	63.1	0.13949	29.9	9.83787	33.2	0.16213
.876	9.97799	63.0	.13979	29.9	.83820	33.1	.16180
.877	9.97862	63.0	.14009	29.9	.83853	33.0	.16147
.878	9.97925	62.9	.14039	30.0	.83886	33.0	.16114
.879	9.97988	62.9	.14069	30.0	.83919	32.9	.16081
0.880	9.98051	62.8	0.14099	30.0	9.83952	32.8	0.16048
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sh gd u	$\omega F_0'$	log co gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
$\alpha .850$	0.033071	6.58	0.14000	30.0	9.83952	3.58	0.14048
$.851$	0.033111	6.58	0.14120	30.0	9.83985	3.58	0.14045
$.852$	0.033152	6.57	0.14250	30.1	9.84018	3.57	0.14082
$.853$	0.033190	6.57	0.14380	30.1	9.84050	3.56	0.15050
$.854$	0.033222	6.57	0.14510	30.1	9.84083	3.56	0.15017
$\alpha .855$	0.033265	6.56	0.14640	30.1	9.84115	3.55	0.15885
$.856$	0.033307	6.56	0.14770	30.1	9.84148	3.54	0.15852
$.857$	0.033349	6.55	0.14900	30.2	9.84180	3.53	0.15820
$.858$	0.033392	6.55	0.15030	30.2	9.84213	3.53	0.15787
$.859$	0.033435	6.54	0.15160	30.2	9.84245	3.52	0.15755
$\alpha .860$	0.033477	6.54	0.15290	30.2	9.84277	3.51	0.15723
$.861$	0.033519	6.53	0.15430	30.3	9.84309	3.51	0.15691
$.862$	0.033562	6.53	0.15560	30.3	9.84341	3.50	0.15659
$.863$	0.033604	6.52	0.15690	30.3	9.84373	3.49	0.15627
$.864$	0.033646	6.52	0.15820	30.3	9.84405	3.49	0.15595
$\alpha .865$	0.033688	6.51	0.15950	30.3	9.84437	3.48	0.15563
$.866$	0.033731	6.51	0.16080	30.4	9.84469	3.47	0.15531
$.867$	0.033773	6.51	0.16210	30.4	9.84500	3.47	0.15500
$.868$	0.033815	6.50	0.16340	30.4	9.84531	3.46	0.15468
$.869$	0.033857	6.50	0.16470	30.4	9.84563	3.45	0.15437
$\alpha .870$	0.033900	6.49	0.16600	30.5	9.84595	3.45	0.15405
$.871$	0.033941	6.49	0.16730	30.5	9.84626	3.44	0.15373
$.872$	0.033983	6.48	0.16860	30.5	9.84658	3.43	0.15342
$.873$	0.034024	6.48	0.16990	30.5	9.84689	3.43	0.15311
$.874$	0.034066	6.47	0.17120	30.5	9.84720	3.42	0.15280
$\alpha .875$	0.034108	6.47	0.17250	30.6	9.84751	3.41	0.15249
$.876$	0.034149	6.47	0.17380	30.6	9.84783	3.41	0.15217
$.877$	0.034191	6.46	0.17510	30.6	9.84814	3.40	0.15185
$.878$	0.034232	6.46	0.17640	30.6	9.84845	3.40	0.15155
$.879$	0.034274	6.45	0.17770	30.7	9.84875	3.39	0.15125
$\alpha .880$	0.034316	6.45	0.17900	30.7	9.84906	3.38	0.15094
$.881$	0.034357	6.44	0.18030	30.7	9.84937	3.37	0.15063
$.882$	0.034398	6.44	0.18160	30.7	9.84968	3.37	0.15032
$.883$	0.034440	6.43	0.18290	30.7	9.84998	3.36	0.15002
$.884$	0.034481	6.43	0.18420	30.8	9.85029	3.35	0.14971
$\alpha .885$	0.034522	6.43	0.18550	30.8	9.85060	3.35	0.14941
$.886$	0.034564	6.42	0.18680	30.8	9.85090	3.34	0.14910
$.887$	0.034605	6.42	0.18810	30.8	9.85120	3.33	0.14880
$.888$	0.034646	6.41	0.18940	30.9	9.85151	3.33	0.14849
$.889$	0.034688	6.41	0.19070	30.9	9.85181	3.32	0.14819
$\alpha .890$	0.034729	6.40	0.19200	30.9	9.85211	3.32	0.14789
$.891$	0.034770	6.40	0.19330	30.9	9.85241	3.31	0.14759
$.892$	0.034811	6.40	0.19460	30.9	9.85271	3.30	0.14729
$.893$	0.034852	6.39	0.19590	31.0	9.85301	3.30	0.14699
$.894$	0.034893	6.39	0.19720	31.0	9.85331	2.99	0.14669
$\alpha .895$	0.034934	6.38	0.19850	31.0	9.85361	2.98	0.14639
$.896$	0.034975	6.38	0.19980	31.0	9.85391	2.98	0.14609
$.897$	0.035016	6.38	0.20110	31.0	9.85421	2.97	0.14579
$.898$	0.035057	6.37	0.20240	31.1	9.85450	2.96	0.14550
$.899$	0.035098	6.37	0.20370	31.1	9.85480	2.96	0.14520
$\alpha .900$	0.035139	6.36	0.20500	31.1	9.85509	2.95	0.14491
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
0.900	0.01137	60,6	0.15527	31,1	9.85509	29,5	0.14491
.901	.01197	60,6	.15653	31,1	.85539	29,5	.14491
.902	.01258	60,5	.15689	31,2	.85568	29,4	.14432
.903	.01318	60,5	.15721	31,2	.85598	29,3	.14402
.904	.01379	60,5	.15752	31,2	.85627	29,3	.14373
0.905	0.01439	60,4	0.15783	31,2	9.85656	29,2	0.14344
.906	.01500	60,4	.15814	31,2	.85685	29,2	.14315
.907	.01560	60,3	.15846	31,3	.85715	29,1	.14285
.908	.01620	60,3	.15877	31,3	.85744	29,0	.14256
.909	.01681	60,3	.15908	31,3	.85773	29,0	.14227
0.910	0.01741	60,2	0.15939	31,3	9.85801	28,9	0.14199
.911	.01801	60,2	.15971	31,3	.85830	28,8	.14170
.912	.01861	60,1	.16002	31,4	.85859	28,8	.14141
.913	.01921	60,1	.16033	31,4	.85888	28,7	.14112
.914	.01981	60,1	.16065	31,4	.85917	28,7	.14083
0.915	0.02041	60,0	0.16096	31,4	9.85945	28,6	0.14055
.916	.02101	60,0	.16128	31,4	.85974	28,5	.14026
.917	.02161	59,9	.16159	31,5	.86002	28,5	.13998
.918	.02221	59,9	.16191	31,5	.86031	28,4	.13969
.919	.02281	59,9	.16222	31,5	.86059	28,4	.13941
0.920	0.02341	59,8	0.16254	31,5	9.86088	28,3	0.13912
.921	.02401	59,8	.16285	31,5	.86116	28,2	.13884
.922	.02461	59,8	.16317	31,6	.86144	28,2	.13856
.923	.02520	59,7	.16348	31,6	.86172	28,1	.13828
.924	.02580	59,7	.16380	31,6	.86200	28,1	.13800
0.925	0.02640	59,6	0.16411	31,6	9.86228	28,0	0.13772
.926	.02699	59,6	.16443	31,6	.86256	27,9	.13744
.927	.02759	59,6	.16475	31,7	.86284	27,9	.13716
.928	.02819	59,5	.16506	31,7	.86312	27,8	.13688
.929	.02878	59,5	.16538	31,7	.86340	27,8	.13660
0.930	0.02937	59,4	0.16570	31,7	9.86368	27,7	0.13632
.931	.02997	59,4	.16602	31,7	.86395	27,7	.13605
.932	.03056	59,4	.16633	31,8	.86423	27,6	.13577
.933	.03116	59,3	.16665	31,8	.86450	27,5	.13550
.934	.03175	59,3	.16697	31,8	.86478	27,5	.13522
0.935	0.03234	59,3	0.16729	31,8	9.86505	27,4	0.13495
.936	.03293	59,2	.16761	31,9	.86533	27,4	.13467
.937	.03353	59,2	.16792	31,9	.86560	27,3	.13440
.938	.03412	59,1	.16824	31,9	.86587	27,3	.13413
.939	.03471	59,1	.16856	31,9	.86615	27,2	.13385
0.940	0.03530	59,1	0.16888	31,9	9.86642	27,1	0.13358
.941	.03589	59,0	.16920	32,0	.86669	27,1	.13331
.942	.03648	59,0	.16952	32,0	.86696	27,0	.13304
.943	.03707	59,0	.16984	32,0	.86723	27,0	.13277
.944	.03766	58,9	.17016	32,0	.86750	26,9	.13250
0.945	0.03825	58,9	0.17048	32,0	9.86777	26,9	0.13223
.946	.03884	58,9	.17080	32,0	.86804	26,8	.13196
.947	.03943	58,8	.17112	32,1	.86830	26,7	.13170
.948	.04001	58,8	.17144	32,1	.86857	26,7	.13143
.949	.04060	58,7	.17176	32,1	.86884	26,6	.13116
0.950	0.04119	58,7	0.17208	32,1	9.86910	26,6	0.13090
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u

# Logarithms of Hyperbolic Functions.

u	log sinh u	co F <sub>0</sub> '	log cosh u	co F <sub>0</sub> '	log sinh u	co F <sub>0</sub> '	log cosh u
0.050	0.0110	58.7	0.17208	34.1	9.86910	26.6	0.13090
0.051	0.01123	58.7	0.17211	34.1	86037	26.5	0.13063
0.052	0.01130	58.6	0.17273	34.2	86063	26.5	0.13037
0.053	0.01155	58.6	0.17305	34.2	86090	26.4	0.13010
0.054	0.01153	58.6	0.17337	34.2	87016	26.4	0.12984
0.055	0.01113	58.5	0.17369	34.2	9.87043	26.3	0.12957
0.056	0.01170	58.5	0.17402	34.2	87069	26.2	0.12931
0.057	0.01130	58.5	0.17434	34.3	87095	26.2	0.12905
0.058	0.01187	58.4	0.17466	34.3	87121	26.1	0.12879
0.059	0.01196	58.4	0.17498	34.3	87147	26.1	0.12853
0.060	0.01204	58.4	0.17531	34.3	9.87173	26.0	0.12827
0.061	0.01203	58.3	0.17563	34.3	87199	26.0	0.12801
0.062	0.01211	58.3	0.17595	34.4	87225	25.9	0.12775
0.063	0.01220	58.2	0.17628	34.4	87251	25.9	0.12749
0.064	0.01237	58.2	0.17660	34.4	87277	25.8	0.12723
0.065	0.01286	58.1	0.17693	34.4	9.87303	25.8	0.12697
0.066	0.01251	58.1	0.17725	34.4	87329	25.7	0.12671
0.067	0.01212	58.1	0.17757	34.5	87354	25.7	0.12646
0.068	0.01220	58.1	0.17790	34.5	87380	25.6	0.12620
0.069	0.01238	58.0	0.17822	34.5	87406	25.5	0.12594
0.070	0.01238	58.0	0.17855	34.5	9.87431	25.5	0.12569
0.071	0.01244	58.0	0.17887	34.5	87456	25.4	0.12544
0.072	0.01262	57.9	0.17920	34.6	87482	25.4	0.12518
0.073	0.01280	57.9	0.17953	34.6	87507	25.3	0.12493
0.074	0.01288	57.9	0.17985	34.6	87533	25.3	0.12467
0.075	0.012576	57.8	0.18018	34.6	9.87558	25.2	0.12442
0.076	0.012533	57.8	0.18050	34.6	87584	25.2	0.12417
0.077	0.012601	57.8	0.18083	34.6	87609	25.1	0.12392
0.078	0.012719	57.7	0.18115	34.7	87634	25.1	0.12367
0.079	0.012667	57.7	0.18148	34.7	87659	25.0	0.12342
0.080	0.012581	57.7	0.18181	34.7	9.87683	25.0	0.12317
0.081	0.012623	57.6	0.18214	34.7	87708	24.9	0.12292
0.082	0.012690	57.6	0.18246	34.7	87733	24.9	0.12267
0.083	0.012732	57.6	0.18279	34.8	87758	24.8	0.12242
0.084	0.012805	57.5	0.18312	34.8	87783	24.8	0.12217
0.085	0.0128033	57.5	0.18345	34.8	9.87807	24.7	0.12193
0.086	0.012810	57.5	0.18378	34.8	87832	24.7	0.12168
0.087	0.012862	57.4	0.18410	34.8	87857	24.6	0.12143
0.088	0.012825	57.4	0.18443	34.9	87882	24.6	0.12119
0.089	0.012883	57.4	0.18476	34.9	87906	24.5	0.12094
0.090	0.0128130	57.4	0.18509	34.9	9.87930	24.5	0.12070
0.091	0.012892	57.3	0.18542	34.9	87955	24.4	0.12045
0.092	0.012851	57.3	0.18575	34.9	87979	24.3	0.12021
0.093	0.012911	57.2	0.18608	34.9	88003	24.3	0.11997
0.094	0.012869	57.2	0.18641	35.0	88028	24.2	0.11972
0.095	0.012725	57.2	0.18674	35.0	9.88052	24.2	0.11948
0.096	0.012783	57.2	0.18707	35.0	88076	24.1	0.11924
0.097	0.012840	57.1	0.18740	35.0	88100	24.1	0.11900
0.098	0.012897	57.1	0.18773	35.0	88124	24.0	0.11876
0.099	0.012854	57.1	0.18806	35.1	88148	24.0	0.11852
1.000	0.02011	57.0	0.18839	35.1	9.88172	23.9	0.11828
u	log tan gd u	co F <sub>0</sub> '	log sec gd u	co F <sub>0</sub> '	log sin gd u	co F <sub>0</sub> '	log cos gd u



Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F'_2$	log cosh u	$\omega F'_2$	log tanh u	$\omega F'_2$	log coth u
1.000	0.07011	57.0	0.18839	33.1	9.88172	23.0	0.118.8
.001	.07058	57.0	.18872	33.1	.88195	23.0	.11804
.002	.07125	57.0	.18905	33.1	.88220	23.8	.11780
.003	.07182	56.9	.18938	33.1	.88244	23.8	.11756
.004	.07239	56.9	.18971	33.1	.88268	23.8	.11732
1.005	0.07296	56.9	0.19004	33.2	9.88291	23.7	0.11700
.005	.07353	56.8	.19038	33.2	.88315	23.7	.11685
.007	.07410	56.8	.19071	33.2	.88339	23.6	.11661
.008	.07466	56.8	.19104	33.2	.88362	23.6	.11638
.009	.07523	56.7	.19137	33.2	.88386	23.5	.11614
1.010	0.07580	56.7	0.19171	33.3	9.88409	23.5	0.11591
.011	.07637	56.7	.19204	33.3	.88433	23.4	.11567
.012	.07693	56.7	.19237	33.3	.88456	23.4	.11544
.013	.07750	56.6	.19270	33.3	.88480	23.3	.11520
.014	.07807	56.6	.19304	33.3	.88503	23.3	.11497
1.015	0.07863	56.6	0.19337	33.3	9.88526	23.2	0.11474
.016	.07920	56.5	.19370	33.4	.88549	23.2	.11451
.017	.07976	56.5	.19404	33.4	.88572	23.1	.11428
.018	.08033	56.5	.19437	33.4	.88595	23.1	.11405
.019	.08089	56.4	.19471	33.4	.88619	23.0	.11381
1.020	0.08146	56.4	0.19504	33.4	9.88642	23.0	0.11358
.021	.08202	56.4	.19537	33.5	.88664	22.9	.11336
.022	.08258	56.4	.19571	33.5	.88687	22.9	.11313
.023	.08315	56.3	.19604	33.5	.88710	22.8	.11290
.024	.08371	56.3	.19638	33.5	.88733	22.8	.11267
1.025	0.08427	56.3	0.19671	33.5	9.88756	22.7	0.11244
.026	.08483	56.2	.19705	33.5	.88779	22.7	.11221
.027	.08540	56.2	.19738	33.6	.88801	22.6	.11199
.028	.08596	56.2	.19772	33.6	.88824	22.6	.11176
.029	.08652	56.1	.19806	33.6	.88846	22.6	.11154
1.030	0.08708	56.1	0.19839	33.6	9.88869	22.5	0.11131
.031	.08764	56.1	.19873	33.6	.88891	22.5	.11109
.032	.08820	56.1	.19906	33.6	.88914	22.4	.11086
.033	.08876	56.0	.19940	33.7	.88936	22.4	.11064
.034	.08932	56.0	.19974	33.7	.88959	22.3	.11041
1.035	0.08988	56.0	0.20007	33.7	9.88981	22.3	0.11019
.036	.09044	55.9	.20041	33.7	.89003	22.2	.10997
.037	.09100	55.9	.20075	33.7	.89025	22.2	.10975
.038	.09156	55.9	.20109	33.7	.89048	22.1	.10952
.039	.09212	55.9	.20142	33.8	.89070	22.1	.10930
1.040	0.09268	55.8	0.20176	33.8	9.89092	22.0	0.10908
.041	.09324	55.8	.20210	33.8	.89114	22.0	.10886
.042	.09379	55.8	.20244	33.8	.89136	22.0	.10864
.043	.09435	55.7	.20278	33.8	.89158	21.9	.10842
.044	.09491	55.7	.20311	33.9	.89180	21.9	.10820
1.045	0.09547	55.7	0.20345	33.9	9.89201	21.8	0.10799
.046	.09602	55.7	.20379	33.9	.89223	21.8	.10777
.047	.09658	55.6	.20413	33.9	.89245	21.7	.10755
.048	.09714	55.6	.20447	33.9	.89267	21.7	.10733
.049	.09769	55.6	.20481	33.9	.89288	21.6	.10712
1.050	0.09825	55.6	0.20515	34.0	9.89310	21.6	0.10690
u	log tan gd u	$\omega F'_2$	log sec gd u	$\omega F'_2$	log sin gd u	$\omega F'_2$	log cos gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.050	0.09325	55.6	0.30515	34.0	9.80310	21.6	0.10590
.051	.09336	55.5	.30517	34.0	.80331	21.6	.10659
.052	.09346	55.5	.30533	34.0	.80353	21.5	.10647
.053	.09357	55.5	.30517	34.0	.80375	21.5	.10625
.054	.09367	55.4	.30551	34.0	.80396	21.4	.10604
1.055	0.10602	55.4	0.30885	34.0	9.80417	21.4	0.10583
.056	.10633	55.4	.30710	34.1	.80430	21.3	.10561
.057	.10643	55.4	.30753	34.1	.80460	21.3	.10540
.058	.10653	55.3	.30787	34.1	.80481	21.2	.10519
.059	.10664	55.3	.30821	34.1	.80502	21.2	.10498
1.060	0.10470	55.3	0.30855	34.1	9.80524	21.2	0.10476
.061	.10481	55.3	.30889	34.1	.80545	21.1	.10455
.062	.10492	55.2	.30924	34.2	.80566	21.1	.10434
.063	.10503	55.2	.30958	34.2	.80587	21.0	.10413
.064	.10514	55.2	.30992	34.2	.80608	21.0	.10392
1.065	0.10655	55.1	0.21025	34.2	9.80629	20.9	0.10371
.066	.10670	55.1	.21060	34.2	.80650	20.9	.10350
.067	.10685	55.1	.21094	34.2	.80671	20.9	.10329
.068	.10695	55.1	.21129	34.3	.80692	20.8	.10308
.069	.10705	55.0	.21163	34.3	.80712	20.8	.10288
1.070	0.10940	55.0	0.21097	34.3	9.80733	20.7	0.10267
.071	.10955	55.0	.21232	34.3	.80754	20.7	.10246
.072	.11010	55.0	.21276	34.3	.80774	20.6	.10226
.073	.11005	54.9	.21300	34.3	.80795	20.6	.10205
.074	.11130	54.9	.21335	34.4	.80816	20.6	.10184
1.075	0.11305	54.9	0.21369	34.4	9.80836	20.5	0.10164
.076	.11350	54.9	.21404	34.4	.80857	20.5	.10143
.077	.11415	54.8	.21438	34.4	.80877	20.4	.10123
.078	.11470	54.8	.21472	34.4	.80898	20.4	.10102
.079	.11424	54.8	.21507	34.4	.80918	20.3	.10082
1.080	0.11470	54.8	0.21541	34.4	9.80938	20.3	0.10062
.081	.11511	54.7	.21575	34.5	.80959	20.3	.10041
.082	.11559	54.7	.21610	34.5	.80979	20.2	.10021
.083	.11613	54.7	.21644	34.5	.80999	20.1	.10001
.084	.11658	54.7	.21679	34.5	.90019	20.1	.09981
1.085	0.11753	54.6	0.21713	34.5	9.90039	20.1	0.09961
.086	.11807	54.6	.21748	34.5	.90059	20.1	.09941
.087	.11852	54.6	.21783	34.6	.90079	20.0	.09921
.088	.11910	54.5	.21817	34.6	.90099	20.0	.09901
.089	.11971	54.5	.21852	34.6	.90119	19.9	.09881
1.090	0.12025	54.5	0.21886	34.6	9.90139	19.9	0.09861
.091	.12086	54.5	.21921	34.6	.90159	19.9	.09841
.092	.12144	54.4	.21955	34.6	.90179	19.8	.09821
.093	.12189	54.4	.21990	34.7	.90199	19.8	.09801
.094	.12243	54.4	.22025	34.7	.90218	19.7	.09782
1.095	0.12398	54.4	0.22059	34.7	9.90238	19.7	0.09762
.096	.12452	54.4	.22094	34.7	.90258	19.6	.09742
.097	.12499	54.3	.22129	34.7	.90277	19.6	.09723
.098	.12561	54.3	.22164	34.7	.90297	19.6	.09703
.099	.12515	54.3	.22198	34.7	.90317	19.5	.09683
1.100	0.12560	54.3	0.22233	34.8	9.90336	19.5	0.09664
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.100	0.12569	54.3	0.22233	34.8	9.99336	19.5	0.00664
.101	.12623	54.2	.22268	34.8	.99350	19.4	.00644
.102	.12678	54.2	.22303	34.8	.99375	19.4	.00625
.103	.12732	54.2	.22337	34.8	.99399	19.4	.00606
.104	.12785	54.2	.22372	34.8	.99414	19.3	.00586
1.105	0.12840	54.1	0.22407	34.8	9.99433	19.3	0.00567
.106	.12894	54.1	.22442	34.9	.99452	19.2	.00548
.107	.12948	54.1	.22477	34.9	.99472	19.2	.00528
.108	.13002	54.1	.22512	34.9	.99491	19.2	.00509
.109	.13056	54.0	.22547	34.9	.99510	19.1	.00490
1.110	0.13111	54.0	0.22582	34.9	9.99529	19.1	0.00471
.111	.13165	54.0	.22616	34.9	.99548	19.1	.00452
.112	.13218	54.0	.22651	35.0	.99567	19.0	.00433
.113	.13272	53.9	.22685	35.0	.99585	19.0	.00414
.114	.13326	53.9	.22721	35.0	.99605	18.9	.00395
1.115	0.13380	53.9	0.22756	35.0	9.99624	18.9	0.00376
.116	.13434	53.9	.22791	35.0	.99643	18.9	.00357
.117	.13488	53.8	.22826	35.0	.99662	18.8	.00338
.118	.13542	53.8	.22861	35.0	.99680	18.8	.00320
.119	.13595	53.8	.22896	35.1	.99699	18.7	.00301
1.120	0.13649	53.8	0.22931	35.1	9.99718	18.7	0.00282
.121	.13703	53.8	.22967	35.1	.99737	18.7	.00263
.122	.13757	53.7	.23002	35.1	.99755	18.6	.00245
.123	.13811	53.7	.23037	35.1	.99774	18.6	.00226
.124	.13864	53.7	.23072	35.1	.99792	18.6	.00208
1.125	0.13918	53.7	0.23107	35.1	9.99811	18.5	0.00189
.126	.13972	53.6	.23142	35.2	.99830	18.5	.00170
.127	.14025	53.6	.23177	35.2	.99848	18.4	.00152
.128	.14079	53.6	.23213	35.2	.99866	18.4	.00134
.129	.14133	53.6	.23248	35.2	.99885	18.4	.00115
1.130	0.14186	53.5	0.23283	35.2	9.99903	18.3	0.00097
.131	.14240	53.5	.23318	35.2	.99921	18.3	.00079
.132	.14293	53.5	.23353	35.3	.99940	18.3	.00061
.133	.14347	53.5	.23389	35.3	.99958	18.2	.00042
.134	.14400	53.5	.23424	35.3	.99976	18.2	.00024
1.135	0.14454	53.4	0.23459	35.3	9.99994	18.1	0.00006
.136	.14507	53.4	.23495	35.3	.991012	18.1	.08688
.137	.14560	53.4	.23530	35.3	.991030	18.1	.08670
.138	.14614	53.4	.23565	35.3	.991049	18.0	.08651
.139	.14667	53.3	.23601	35.4	.991067	18.0	.08633
1.140	0.14720	53.3	0.23636	35.4	9.991085	18.0	0.08615
.141	.14774	53.3	.23671	35.4	.991102	17.9	.08598
.142	.14827	53.3	.23707	35.4	.991120	17.9	.08580
.143	.14880	53.3	.23742	35.4	.991138	17.8	.08562
.144	.14934	53.2	.23778	35.4	.991156	17.8	.08544
1.145	0.14987	53.2	0.23813	35.4	9.991174	17.8	0.08526
.146	.15040	53.2	.23848	35.5	.991192	17.7	.08508
.147	.15093	53.2	.23884	35.5	.991209	17.7	.08491
.148	.15146	53.2	.23919	35.5	.991227	17.7	.08473
.149	.15200	53.1	.23955	35.5	.991245	17.6	.08455
1.150	0.15253	53.1	0.23990	35.5	9.991262	17.6	0.08438
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cos gd u

SMITHSONIAN TABLE

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
1.150	0.15353	53.1	0.24090	35.5	9.91262	17.6	0.08738
.151	.15366	53.1	.24096	35.5	.91280	17.6	.08720
.152	.15379	53.1	.24101	35.5	.91297	17.5	.08703
.153	.15391	53.0	.24107	35.6	.91315	17.5	.08685
.154	.15405	53.0	.24113	35.6	.91332	17.5	.08668
1.155	0.15538	53.0	0.24108	35.6	9.91350	17.4	0.08650
.156	.15571	53.0	.24101	35.6	.91367	17.4	.08633
.157	.15603	53.0	.24130	35.6	.91385	17.3	.08615
.158	.15627	53.0	.24125	35.6	.91402	17.4	.08598
.159	.15650	53.0	.24111	35.6	.91419	17.3	.08581
1.160	0.15783	53.0	0.24136	35.7	9.91436	17.2	0.08564
.161	.15816	53.0	.24182	35.7	.91454	17.2	.08546
.162	.15848	53.0	.24118	35.7	.91471	17.2	.08529
.163	.15881	53.3	.24153	35.7	.91488	17.1	.08512
.164	.15904	53.3	.24189	35.7	.91505	17.1	.08495
1.165	0.16042	53.3	0.24535	35.7	9.91522	17.1	0.08478
.166	.16100	53.3	.24500	35.7	.91539	17.0	.08461
.167	.16152	53.7	.24500	35.8	.91556	17.0	.08444
.168	.16205	53.7	.24632	35.8	.91573	17.0	.08427
.169	.16258	53.7	.24668	35.8	.91590	16.9	.08410
1.170	0.16411	53.7	0.24703	35.8	9.91607	16.9	0.08393
.171	.16463	53.7	.24730	35.8	.91624	16.9	.08376
.172	.16516	53.6	.24775	35.8	.91641	16.8	.08359
.173	.16560	53.6	.24811	35.8	.91658	16.8	.08342
.174	.16604	53.6	.24847	35.9	.91674	16.8	.08326
1.175	0.16724	53.6	0.24883	35.9	9.91691	16.7	0.08309
.176	.16776	53.6	.24919	35.9	.91708	16.7	.08292
.177	.16829	53.5	.24954	35.9	.91724	16.7	.08276
.178	.16881	53.5	.24990	35.9	.91741	16.6	.08259
.179	.16934	53.5	.25026	35.9	.91758	16.6	.08242
1.180	0.16846	53.5	0.25062	35.9	9.91774	16.6	0.08226
.181	.16889	53.5	.25093	35.9	.91791	16.5	.08209
.182	.16941	53.4	.25111	36.0	.91807	16.5	.08193
.183	.16994	53.4	.25170	36.0	.91824	16.4	.08176
.184	.17046	53.4	.25205	36.0	.91840	16.4	.08160
1.185	0.17099	53.4	0.25243	36.0	9.91857	16.4	0.08143
.186	.17151	53.4	.25278	36.0	.91873	16.3	.08127
.187	.17203	53.3	.25314	36.0	.91890	16.3	.08111
.188	.17256	53.1	.25350	36.0	.91906	16.3	.08094
.189	.17308	53.3	.25385	36.1	.91922	16.2	.08078
1.190	0.17360	53.3	0.25422	36.1	9.91938	16.2	0.08062
.191	.17413	53.3	.25458	36.1	.91954	16.2	.08046
.192	.17465	53.2	.25494	36.1	.91970	16.2	.08030
.193	.17517	53.2	.25530	36.1	.91987	16.1	.08013
.194	.17569	53.2	.25567	36.1	.92003	16.1	.07997
1.195	0.17621	53.2	0.25603	36.1	9.92019	16.1	0.07981
.196	.17674	53.3	.25639	36.2	.92035	16.0	.07965
.197	.17726	53.2	.25675	36.2	.92051	16.0	.07949
.198	.17778	53.1	.25711	36.2	.92067	16.0	.07933
.199	.17830	53.1	.25747	36.3	.92083	15.9	.07917
1.200	0.17882	53.1	0.25784	36.2	9.92099	15.9	0.07901
$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.200	0.17832	52,1	0.25784	36,2	9.92099	15,9	0.07601
.201	.17934	52,1	.25820	36,2	.92114	15,9	.07886
.202	.17985	52,1	.25856	36,2	.92130	15,8	.07870
.203	.18038	52,0	.25892	36,2	.92146	15,8	.07854
.204	.18090	52,0	.25929	36,3	.92162	15,8	.07838
1.205	0.18142	52,0	0.25965	36,3	9.92178	15,7	0.07822
.206	.18194	52,0	.26001	36,3	.92193	15,7	.07807
.207	.18246	52,0	.26037	36,3	.92209	15,7	.07791
.208	.18298	51,9	.26074	36,3	.92225	15,6	.07775
.209	.18350	51,9	.26110	36,3	.92240	15,6	.07760
1.210	0.18402	51,9	0.26146	36,3	9.92256	15,6	0.07744
.211	.18454	51,9	.26183	36,3	.92271	15,5	.07729
.212	.18506	51,9	.26219	36,4	.92287	15,5	.07713
.213	.18558	51,9	.26255	36,4	.92302	15,5	.07698
.214	.18610	51,8	.26292	36,4	.92318	15,4	.07682
1.215	0.18662	51,8	0.26328	36,4	9.92333	15,4	0.07667
.216	.18713	51,8	.26365	36,4	.92349	15,4	.07651
.217	.18765	51,8	.26401	36,4	.92364	15,4	.07636
.218	.18817	51,8	.26437	36,4	.92379	15,3	.07621
.219	.18869	51,7	.26474	36,5	.92395	15,3	.07605
1.220	0.18920	51,7	0.26510	36,5	9.92410	15,3	0.07590
.221	.18972	51,7	.26547	36,5	.92425	15,2	.07575
.222	.19024	51,7	.26583	36,5	.92440	15,2	.07560
.223	.19075	51,7	.26620	36,5	.92456	15,2	.07544
.224	.19127	51,7	.26656	36,5	.92471	15,1	.07529
1.225	0.19179	51,6	0.26693	36,5	9.92486	15,1	0.07514
.226	.19230	51,6	.26729	36,5	.92501	15,1	.07499
.227	.19282	51,6	.26766	36,6	.92516	15,0	.07484
.228	.19334	51,6	.26802	36,6	.92531	15,0	.07469
.229	.19385	51,6	.26839	36,6	.92546	15,0	.07454
1.230	0.19437	51,5	0.26876	36,6	9.92561	15,0	0.07439
.231	.19488	51,5	.26912	36,6	.92576	14,9	.07424
.232	.19540	51,5	.26949	36,6	.92591	14,9	.07409
.233	.19591	51,5	.26985	36,6	.92606	14,9	.07394
.234	.19643	51,5	.27022	36,6	.92621	14,8	.07379
1.235	0.19694	51,5	0.27059	36,7	9.92635	14,8	0.07365
.236	.19746	51,4	.27095	36,7	.92650	14,8	.07350
.237	.19797	51,4	.27132	36,7	.92665	14,7	.07335
.238	.19848	51,4	.27169	36,7	.92680	14,7	.07320
.239	.19900	51,4	.27205	36,7	.92694	14,7	.07306
1.240	0.19951	51,4	0.27242	36,7	9.92709	14,7	0.07291
.241	.20003	51,4	.27279	36,7	.92724	14,6	.07276
.242	.20054	51,3	.27316	36,7	.92738	14,6	.07262
.243	.20105	51,3	.27352	36,8	.92753	14,6	.07247
.244	.20157	51,3	.27389	36,8	.92767	14,5	.07233
1.245	0.20208	51,3	0.27426	36,8	9.92782	14,5	0.07218
.246	.20259	51,3	.27463	36,8	.92796	14,5	.07204
.247	.20310	51,2	.27499	36,8	.92811	14,4	.07189
.248	.20362	51,2	.27536	36,8	.92825	14,4	.07175
.249	.20413	51,2	.27573	36,8	.92840	14,4	.07160
1.250	0.20464	51,2	0.27610	36,8	9.92854	14,4	0.07146
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
1.450	0.20104	51.2	0.27610	36.8	0.02854	1.4	0.07146
1.451	0.20115	51.2	0.27617	36.9	0.02868	1.4	0.07132
1.452	0.20126	51.2	0.27624	36.9	0.02883	1.4	0.07117
1.453	0.20138	51.1	0.27721	36.9	0.02897	1.4	0.07103
1.454	0.20149	51.1	0.27757	36.9	0.02911	1.4	0.07089
1.455	0.20160	51.1	0.27794	36.9	0.02926	1.4	0.07074
1.456	0.20171	51.1	0.27831	36.9	0.02940	1.4	0.07060
1.457	0.20182	51.1	0.27868	36.9	0.02954	1.4	0.07046
1.458	0.20193	51.1	0.27905	36.9	0.02968	1.4	0.07032
1.459	0.20204	51.0	0.27942	36.9	0.02982	1.4	0.07018
1.460	0.20215	51.0	0.27979	37.0	0.02996	1.4	0.07004
1.461	0.20226	51.0	0.28016	37.0	0.03010	1.4	0.06990
1.462	0.20237	51.0	0.28053	37.0	0.03024	1.4	0.06976
1.463	0.20248	51.0	0.28090	37.0	0.03038	1.4	0.06962
1.464	0.20259	51.0	0.28127	37.0	0.03052	1.4	0.06948
1.465	0.20270	50.9	0.28164	37.0	0.03066	1.3	0.06934
1.466	0.20281	50.9	0.28201	37.0	0.03080	1.3	0.06920
1.467	0.20292	50.9	0.28238	37.0	0.03094	1.3	0.06906
1.468	0.20303	50.9	0.28275	37.1	0.03108	1.3	0.06892
1.469	0.20314	50.9	0.28312	37.1	0.03122	1.3	0.06878
1.470	0.20325	50.9	0.28349	37.1	0.03136	1.3	0.06865
1.471	0.20336	50.9	0.28386	37.1	0.03150	1.3	0.06851
1.472	0.20347	50.8	0.28423	37.1	0.03164	1.3	0.06837
1.473	0.20358	50.8	0.28460	37.1	0.03178	1.3	0.06823
1.474	0.20369	50.8	0.28497	37.1	0.03192	1.3	0.06810
1.475	0.20380	50.8	0.28534	37.1	0.03206	1.3	0.06796
1.476	0.20391	50.8	0.28571	37.2	0.03220	1.3	0.06782
1.477	0.20402	50.8	0.28608	37.2	0.03234	1.3	0.06769
1.478	0.20413	50.7	0.28645	37.2	0.03248	1.3	0.06755
1.479	0.20424	50.7	0.28682	37.2	0.03262	1.3	0.06742
1.480	0.20435	50.7	0.28719	37.2	0.03276	1.3	0.06728
1.481	0.20446	50.7	0.28756	37.2	0.03290	1.3	0.06715
1.482	0.20457	50.7	0.28793	37.2	0.03304	1.3	0.06701
1.483	0.20468	50.7	0.28830	37.2	0.03318	1.3	0.06688
1.484	0.20479	50.6	0.28867	37.2	0.03332	1.3	0.06674
1.485	0.20490	50.6	0.28904	37.3	0.03346	1.3	0.06661
1.486	0.20501	50.6	0.28941	37.3	0.03360	1.3	0.06647
1.487	0.20512	50.6	0.28978	37.3	0.03374	1.3	0.06634
1.488	0.20523	50.6	0.29015	37.3	0.03388	1.3	0.06621
1.489	0.20534	50.6	0.29052	37.3	0.03402	1.3	0.06608
1.490	0.20545	50.6	0.29089	37.3	0.03416	1.3	0.06594
1.491	0.20556	50.5	0.29126	37.3	0.03430	1.3	0.06581
1.492	0.20567	50.5	0.29163	37.3	0.03444	1.3	0.06568
1.493	0.20578	50.5	0.29200	37.3	0.03458	1.3	0.06555
1.494	0.20589	50.5	0.29237	37.3	0.03472	1.3	0.06542
1.495	0.20600	50.5	0.29274	37.4	0.03486	1.3	0.06528
1.496	0.20611	50.5	0.29311	37.4	0.03500	1.3	0.06515
1.497	0.20622	50.4	0.29348	37.4	0.03514	1.3	0.06502
1.498	0.20633	50.4	0.29385	37.4	0.03528	1.3	0.06489
1.499	0.20644	50.4	0.29422	37.4	0.03542	1.3	0.06476
1.500	0.20655	50.4	0.29459	37.4	0.03556	1.3	0.06463
$u$	$\log \tan pu$	$\omega F_u'$	$\log \sec pu$	$\omega F_u'$	$\log \sin pu$	$\omega F_u'$	$\log \csc pu$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.300	0.23004	50.1	0.29167	37.4	9.93537	13.0	0.06403
.301	.23054	50.1	.29504	37.4	.93550	12.9	.06450
.302	.23104	50.1	.29542	37.4	.93563	12.9	.06497
.303	.23155	50.1	.29579	37.5	.93576	12.9	.06544
.304	.23205	50.3	.29617	37.5	.93588	12.9	.06591
1.305	0.23255	50.3	0.29654	37.5	9.93601	12.8	0.06639
.306	.23306	50.3	.29692	37.5	.93614	12.8	.06686
.307	.23356	50.3	.29720	37.5	.93627	12.8	.06733
.308	.23406	50.3	.29767	37.5	.93640	12.8	.06780
.309	.23457	50.3	.29804	37.5	.93652	12.7	.06827
1.310	0.23507	50.2	0.29842	37.5	9.93665	12.7	0.06875
.311	.23557	50.2	.29879	37.5	.93678	12.7	.06922
.312	.23607	50.2	.29917	37.6	.93691	12.7	.06969
.313	.23657	50.2	.29954	37.6	.93703	12.6	.07016
.314	.23708	50.2	.29992	37.6	.93716	12.6	.07063
1.315	0.23758	50.2	0.30029	37.6	9.93728	12.6	0.07111
.316	.23808	50.2	.30067	37.6	.93741	12.6	.07158
.317	.23858	50.1	.30105	37.6	.93754	12.5	.07205
.318	.23908	50.1	.30142	37.6	.93766	12.5	.07252
.319	.23958	50.1	.30180	37.6	.93779	12.5	.07299
1.320	0.24009	50.1	0.30217	37.6	9.93791	12.5	0.07347
.321	.24059	50.1	.30255	37.7	.93804	12.4	.07394
.322	.24109	50.1	.30293	37.7	.93816	12.4	.07441
.323	.24159	50.1	.30330	37.7	.93828	12.4	.07488
.324	.24209	50.0	.30368	37.7	.93841	12.4	.07535
1.325	0.24259	50.0	0.30405	37.7	9.93853	12.3	0.07583
.326	.24309	50.0	.30444	37.7	.93865	12.3	.07630
.327	.24359	50.0	.30481	37.7	.93878	12.3	.07677
.328	.24409	50.0	.30519	37.7	.93890	12.3	.07724
.329	.24459	50.0	.30557	37.7	.93902	12.2	.07771
1.330	0.24509	50.0	0.30594	37.8	9.93914	12.2	0.07819
.331	.24559	49.9	.30632	37.8	.93927	12.2	.07866
.332	.24609	49.9	.30670	37.8	.93939	12.2	.07913
.333	.24659	49.9	.30708	37.8	.93951	12.1	.07960
.334	.24709	49.9	.30746	37.8	.93963	12.1	.08007
1.335	0.24759	49.9	0.30783	37.8	9.93975	12.1	0.08055
.336	.24808	49.9	.30821	37.8	.93987	12.1	.08102
.337	.24858	49.9	.30859	37.8	.93999	12.0	.08149
.338	.24908	49.9	.30897	37.8	.94011	12.0	.08196
.339	.24958	49.8	.30935	37.8	.94023	12.0	.08243
1.340	0.25008	49.8	0.30972	37.9	9.94035	12.0	0.08291
.341	.25058	49.8	.31010	37.9	.94047	11.9	.08338
.342	.25107	49.8	.31048	37.9	.94059	11.9	.08385
.343	.25157	49.8	.31085	37.9	.94071	11.9	.08432
.344	.25207	49.8	.31124	37.9	.94083	11.9	.08479
1.345	0.25257	49.8	0.31162	37.9	9.94095	11.8	0.08527
.346	.25306	49.7	.31200	37.9	.94107	11.8	.08574
.347	.25356	49.7	.31238	37.9	.94119	11.8	.08621
.348	.25406	49.7	.31276	37.9	.94130	11.8	.08668
.349	.25456	49.7	.31314	37.9	.94142	11.8	.08715
1.350	0.25505	49.7	0.31352	38.0	9.94154	11.7	0.08763
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

SMITHSONIAN TABLES

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
1.350	0.45505	49.2	0.31352	38.0	9.94154	11.7	0.55810
1.351	0.45535	49.2	0.31360	38.0	9.94166	11.7	0.55841
1.352	0.45565	49.2	0.31368	38.0	9.94177	11.7	0.55872
1.353	0.45595	49.0	0.31395	38.0	9.94180	11.7	0.55811
1.354	0.45624	49.0	0.31503	38.0	9.94201	11.6	0.55762
1.355	0.45654	49.6	0.31541	38.0	9.94212	11.6	0.55788
1.356	0.45684	49.6	0.31580	38.0	9.94224	11.6	0.55776
1.357	0.45713	49.6	0.31618	38.0	9.94235	11.6	0.55705
1.358	0.45743	49.6	0.31656	38.0	9.94247	11.5	0.55753
1.359	0.45773	49.6	0.31694	38.1	9.94258	11.5	0.55742
1.360	0.45803	49.6	0.31732	38.1	9.94270	11.5	0.55730
1.361	0.45833	49.5	0.31770	38.1	9.94281	11.5	0.55719
1.362	0.45863	49.5	0.31808	38.1	9.94293	11.4	0.55707
1.363	0.45893	49.5	0.31846	38.1	9.94304	11.4	0.55696
1.364	0.45923	49.5	0.31884	38.1	9.94316	11.4	0.55684
1.365	0.45953	49.5	0.31922	38.1	9.94327	11.4	0.55673
1.366	0.45983	49.5	0.31960	38.1	9.94338	11.4	0.55662
1.367	0.46013	49.5	0.31998	38.1	9.94350	11.3	0.55650
1.368	0.46043	49.5	0.32036	38.1	9.94361	11.3	0.55639
1.369	0.46073	49.4	0.32075	38.2	9.94372	11.3	0.55628
1.370	0.46103	49.4	0.32113	38.2	9.94384	11.3	0.55616
1.371	0.46133	49.4	0.32151	38.2	9.94395	11.3	0.55605
1.372	0.46163	49.4	0.32189	38.2	9.94406	11.3	0.55594
1.373	0.46193	49.4	0.32227	38.2	9.94417	11.3	0.55583
1.374	0.46223	49.4	0.32266	38.2	9.94429	11.2	0.55571
1.375	0.46253	49.4	0.32304	38.2	9.94440	11.2	0.55560
1.376	0.46283	49.3	0.32342	38.2	9.94451	11.1	0.55549
1.377	0.46313	49.3	0.32380	38.2	9.94462	11.1	0.55538
1.378	0.46343	49.3	0.32418	38.2	9.94473	11.1	0.55527
1.379	0.46373	49.3	0.32457	38.2	9.94484	11.1	0.55516
1.380	0.46403	49.3	0.32495	38.3	9.94495	11.0	0.55505
1.381	0.46433	49.3	0.32533	38.3	9.94506	11.0	0.55494
1.382	0.46463	49.3	0.32571	38.3	9.94517	11.0	0.55483
1.383	0.46493	49.3	0.32610	38.3	9.94528	11.0	0.55472
1.384	0.46523	49.2	0.32648	38.3	9.94539	11.0	0.55461
1.385	0.46553	49.3	0.32686	38.3	9.94550	10.9	0.55450
1.386	0.46583	49.2	0.32725	38.3	9.94561	10.9	0.55439
1.387	0.46613	49.2	0.32763	38.3	9.94572	10.9	0.55428
1.388	0.46643	49.2	0.32801	38.3	9.94583	10.9	0.55417
1.389	0.46673	49.2	0.32840	38.3	9.94594	10.8	0.55406
1.390	0.46703	49.2	0.32878	38.4	9.94604	10.8	0.55395
1.391	0.46733	49.2	0.32916	38.4	9.94615	10.8	0.55385
1.392	0.46763	49.2	0.32955	38.4	9.94626	10.8	0.55374
1.393	0.46793	49.1	0.32993	38.4	9.94637	10.8	0.55363
1.394	0.46823	49.1	0.33031	38.4	9.94648	10.7	0.55352
1.395	0.46853	49.1	0.33070	38.4	9.94658	10.7	0.55342
1.396	0.46883	49.1	0.33108	38.4	9.94669	10.7	0.55331
1.397	0.46913	49.1	0.33147	38.4	9.94680	10.7	0.55320
1.398	0.46943	49.1	0.33185	38.4	9.94690	10.6	0.55310
1.399	0.46973	49.1	0.33224	38.4	9.94701	10.6	0.55299
1.400	0.47003	49.1	0.33262	38.5	9.94712	10.6	0.55288
u	log tanh u	$\omega F_u'$	log sech u	$\omega F_u'$	log sinh u	$\omega F_u'$	log cosh u



# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
I. 400	0.27974	49,1	0.33262	38,5	9.94712	10,6	0.05288
.401	.28023	49,0	.33300	38,5	.94722	10,6	.05278
.402	.28072	49,0	.33339	38,5	.94733	10,6	.05267
.403	.28121	49,0	.33377	38,5	.94743	10,5	.05257
.404	.28170	49,0	.33416	38,5	.94754	10,5	.05246
I. 405	0.28219	49,0	0.33454	38,5	9.94764	10,5	0.05236
.406	.28268	49,0	.33493	38,5	.94775	10,5	.05225
.407	.28317	49,0	.33531	38,5	.94785	10,5	.05215
.408	.28366	49,0	.33570	38,5	.94796	10,4	.05204
.409	.28415	48,9	.33608	38,5	.94806	10,4	.05194
I. 410	0.28464	48,9	0.33647	38,5	9.94817	10,4	0.05183
.411	.28512	48,9	.33686	38,6	.94827	10,4	.05173
.412	.28561	48,9	.33724	38,6	.94837	10,3	.05163
.413	.28610	48,9	.33763	38,6	.94848	10,3	.05152
.414	.28659	48,9	.33801	38,6	.94858	10,3	.05142
I. 415	0.28708	48,9	0.33840	38,6	9.94868	10,3	0.05132
.416	.28757	48,9	.33878	38,6	.94879	10,3	.05121
.417	.28806	48,9	.33917	38,6	.94889	10,2	.05111
.418	.28855	48,8	.33956	38,6	.94899	10,2	.05101
.419	.28903	48,8	.33994	38,6	.94909	10,2	.05091
I. 420	0.28952	48,8	0.34033	38,6	9.94919	10,2	0.05081
.421	.29001	48,8	.34071	38,6	.94930	10,2	.05070
.422	.29050	48,8	.34110	38,7	.94940	10,1	.05060
.423	.29099	48,8	.34149	38,7	.94950	10,1	.05050
.424	.29147	48,8	.34187	38,7	.94960	10,1	.05040
I. 425	0.29196	48,8	0.34226	38,7	9.94970	10,1	0.05030
.426	.29245	48,8	.34265	38,7	.94980	10,1	.05020
.427	.29294	48,7	.34304	38,7	.94990	10,0	.05010
.428	.29342	48,7	.34342	38,7	.95000	10,0	.05000
.429	.29391	48,7	.34381	38,7	.95010	10,0	.04990
I. 430	0.29440	48,7	0.34420	38,7	9.95020	10,0	0.04980
.431	.29489	48,7	.34458	38,7	.95030	10,0	.04970
.432	.29537	48,7	.34497	38,7	.95040	9,9	.04960
.433	.29586	48,7	.34536	38,8	.95050	9,9	.04950
.434	.29635	48,7	.34575	38,8	.95060	9,9	.04940
I. 435	0.29683	48,7	0.34613	38,8	9.95070	9,9	0.04930
.436	.29732	48,6	.34652	38,8	.95080	9,9	.04920
.437	.29781	48,6	.34691	38,8	.95090	9,8	.04910
.438	.29829	48,6	.34730	38,8	.95099	9,8	.04901
.439	.29878	48,6	.34769	38,8	.95109	9,8	.04891
I. 440	0.29926	48,6	0.34807	38,8	9.95119	9,8	0.04881
.441	.29975	48,6	.34846	38,8	.95129	9,8	.04871
.442	.30024	48,6	.34885	38,8	.95139	9,7	.04861
.443	.30072	48,6	.34924	38,8	.95148	9,7	.04852
.444	.30121	48,6	.34963	38,8	.95158	9,7	.04842
I. 445	0.30169	48,5	0.35002	38,9	9.95168	9,7	0.04832
.446	.30218	48,5	.35040	38,9	.95177	9,7	.04823
.447	.30266	48,5	.35079	38,9	.95187	9,6	.04813
.448	.30315	48,5	.35118	38,9	.95197	9,6	.04803
.449	.30363	48,5	.35157	38,9	.95206	9,6	.04794
I. 450	0.30412	48,5	0.35196	38,9	9.95216	9,6	0.04784
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cose gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
1.450	0.30442	.48.5	0.35006	38.0	0.05216	9.6	0.04781
.451	.30460	.48.5	.35025	38.0	.05225	9.6	.04775
.452	.30480	.48.5	.35044	38.0	.05235	9.5	.04765
.453	.30502	.48.5	.35063	38.0	.05245	9.5	.04755
.454	.30526	.48.4	.35082	38.0	.05254	9.5	.04746
1.455	0.30651	.48.4	0.35301	38.0	0.05461	9.5	0.04736
.456	.30703	.48.4	.35340	38.0	.05474	9.5	.04727
.457	.30751	.48.4	.35368	38.0	.05483	9.5	.04717
.458	.30799	.48.4	.35397	38.0	.05492	9.4	.04708
.459	.30848	.48.4	.35426	38.0	.05501	9.4	.04699
1.460	0.30995	.48.4	0.35585	38.0	0.05511	9.4	0.04689
.461	.31015	.48.4	.35604	38.0	.05520	9.4	.04680
.462	.31034	.48.4	.35623	38.0	.05530	9.4	.04670
.463	.31054	.48.3	.35702	38.0	.05539	9.3	.04661
.464	.31090	.48.3	.35741	38.0	.05548	9.3	.04652
1.465	0.31138	.48.3	0.35780	38.0	0.05558	9.3	0.04642
.466	.31181	.48.3	.35819	38.0	.05567	9.3	.04633
.467	.31225	.48.3	.35858	38.0	.05576	9.3	.04624
.468	.31263	.48.3	.35897	38.1	.05585	9.2	.04615
.469	.31331	.48.3	.35937	38.1	.05595	9.2	.04605
1.470	0.31420	.48.3	0.35976	38.1	0.05594	9.2	0.04596
.471	.31438	.48.3	.36015	38.1	.05613	9.2	.04587
.472	.31476	.48.3	.36054	38.1	.05622	9.2	.04578
.473	.31524	.48.2	.36093	38.1	.05631	9.2	.04569
.474	.31572	.48.2	.36132	38.1	.05641	9.1	.04559
1.475	0.31621	.48.2	0.36171	38.1	0.05650	9.1	0.04550
.476	.31669	.48.2	.36210	38.1	.05659	9.1	.04541
.477	.31717	.48.2	.36249	38.1	.05668	9.1	.04532
.478	.31765	.48.2	.36288	38.1	.05677	9.1	.04523
.479	.31814	.48.2	.36328	38.1	.05686	9.0	.04514
1.480	0.31862	.48.2	0.36367	38.2	0.05695	9.0	0.04505
.481	.31910	.48.2	.36406	38.2	.05704	9.0	.04496
.482	.31958	.48.2	.36445	38.2	.05713	9.0	.04487
.483	.32006	.48.1	.36484	38.2	.05722	9.0	.04478
.484	.32054	.48.1	.36523	38.2	.05731	9.0	.04469
1.485	0.32102	.48.1	0.36562	38.2	0.05740	8.9	0.04460
.486	.32151	.48.1	.36602	38.2	.05749	8.9	.04451
.487	.32199	.48.1	.36641	38.2	.05758	8.9	.04442
.488	.32247	.48.1	.36680	38.2	.05767	8.9	.04433
.489	.32295	.48.1	.36719	38.2	.05776	8.9	.04424
1.490	0.32343	.48.1	0.36759	38.2	0.05785	8.8	0.04416
.491	.32391	.48.1	.36798	38.2	.05793	8.8	.04407
.492	.32439	.48.1	.36837	38.2	.05802	8.8	.04398
.493	.32487	.48.0	.36876	38.3	.05811	8.8	.04389
.494	.32535	.48.0	.36916	38.3	.05820	8.8	.04380
1.495	0.32583	.48.0	0.36955	38.3	0.05828	8.8	0.04372
.496	.32631	.48.0	.36994	38.3	.05837	8.7	.04363
.497	.32679	.48.0	.37033	38.3	.05846	8.7	.04354
.498	.32727	.48.0	.37073	38.3	.05855	8.7	.04345
.499	.32775	.48.0	.37112	38.3	.05863	8.7	.04337
1.500	0.32823	.48.0	0.37151	38.3	0.05872	8.7	0.04328
$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.500	0.32823	48.0	0.37151	39.3	9.95672	8.7	0.04328
.501	.32871	48.0	.37191	39.3	.95681	8.7	.04319
.502	.32919	48.0	.37230	39.3	.95689	8.6	.04311
.503	.32967	48.0	.37269	39.3	.95698	8.6	.04302
.504	.33015	47.9	.37309	39.3	.95707	8.6	.04293
1.505	0.33063	47.9	0.37348	39.3	9.95715	8.6	0.04285
.506	.33111	47.9	.37387	39.4	.95724	8.6	.04276
.507	.33159	47.9	.37427	39.4	.95732	8.5	.04268
.508	.33207	47.9	.37466	39.4	.95741	8.5	.04259
.509	.33255	47.9	.37505	39.4	.95749	8.5	.04251
1.510	0.33303	47.9	0.37545	39.4	9.95758	8.5	0.04242
.511	.33350	47.9	.37584	39.4	.95766	8.5	.04234
.512	.33398	47.9	.37624	39.4	.95775	8.5	.04225
.513	.33446	47.9	.37663	39.4	.95783	8.4	.04217
.514	.33494	47.8	.37702	39.4	.95792	8.4	.04208
1.515	0.33542	47.8	0.37742	39.4	9.95800	8.4	0.04200
.516	.33590	47.8	.37781	39.4	.95808	8.4	.04192
.517	.33638	47.8	.37821	39.4	.95817	8.4	.04183
.518	.33685	47.8	.37860	39.4	.95825	8.4	.04175
.519	.33733	47.8	.37900	39.5	.95834	8.3	.04166
1.520	0.33781	47.8	0.37939	39.5	9.95842	8.3	0.04158
.521	.33829	47.8	.37979	39.5	.95850	8.3	.04150
.522	.33877	47.8	.38018	39.5	.95859	8.3	.04141
.523	.33924	47.8	.38057	39.5	.95867	8.3	.04133
.524	.33972	47.8	.38097	39.5	.95875	8.3	.04125
1.525	0.34020	47.7	0.38136	39.5	9.95883	8.2	0.04117
.526	.34068	47.7	.38176	39.5	.95892	8.2	.04108
.527	.34115	47.7	.38215	39.5	.95900	8.2	.04100
.528	.34163	47.7	.38255	39.5	.95908	8.2	.04092
.529	.34211	47.7	.38295	39.5	.95916	8.2	.04084
1.530	0.34258	47.7	0.38334	39.5	9.95924	8.2	0.04076
.531	.34306	47.7	.38374	39.5	.95933	8.1	.04067
.532	.34354	47.7	.38413	39.6	.95941	8.1	.04059
.533	.34402	47.7	.38453	39.6	.95949	8.1	.04051
.534	.34449	47.7	.38492	39.6	.95957	8.1	.04043
1.535	0.34497	47.7	0.38532	39.6	9.95965	8.1	0.04035
.536	.34545	47.6	.38571	39.6	.95973	8.1	.04027
.537	.34592	47.6	.38611	39.6	.95981	8.0	.04019
.538	.34640	47.6	.38651	39.6	.95989	8.0	.04011
.539	.34687	47.6	.38690	39.6	.95997	8.0	.04003
1.540	0.34735	47.6	0.38730	39.6	9.96005	8.0	0.03995
.541	.34783	47.6	.38769	39.6	.96013	8.0	.03987
.542	.34830	47.6	.38809	39.6	.96021	8.0	.03979
.543	.34878	47.6	.38849	39.6	.96029	8.0	.03971
.544	.34925	47.6	.38888	39.6	.96037	7.9	.03963
1.545	0.34973	47.6	0.38928	39.6	9.96045	7.9	0.03955
.546	.35021	47.6	.38968	39.7	.96053	7.9	.03947
.547	.35068	47.6	.39007	39.7	.96061	7.9	.03939
.548	.35116	47.5	.39047	39.7	.96069	7.9	.03931
.549	.35163	47.5	.39087	39.7	.96077	7.9	.03923
1.550	0.35211	47.5	0.39126	39.7	9.96084	7.8	0.03916
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.550	0.35211	47.5	0.39136	39.7	9.95081	7.8	0.03916
.551	.35258	47.5	.39166	39.7	.95092	7.8	.03908
.552	.35305	47.5	.39206	39.7	.95100	7.8	.03900
.553	.35353	47.5	.39245	39.7	.95108	7.8	.03892
.554	.35401	47.5	.39285	39.7	.95116	7.8	.03884
1.555	0.35448	47.5	0.39325	39.7	9.95123	7.8	0.03877
.556	.35496	47.5	.39366	39.7	.95131	7.7	.03869
.557	.35543	47.5	.39404	39.7	.95139	7.7	.03861
.558	.35591	47.5	.39444	39.7	.95147	7.7	.03853
.559	.35638	47.5	.39484	39.7	.95154	7.7	.03846
1.560	0.35686	47.4	0.39524	39.8	9.95162	7.7	0.03838
.561	.35733	47.4	.39563	39.8	.95170	7.7	.03830
.562	.35780	47.4	.39603	39.8	.95177	7.7	.03824
.563	.35828	47.4	.39643	39.8	.95185	7.6	.03815
.564	.35875	47.4	.39683	39.8	.95193	7.6	.03807
1.565	0.35923	47.4	0.39723	39.8	9.95200	7.6	0.03800
.566	.35970	47.4	.39762	39.8	.95208	7.6	.03792
.567	.36017	47.4	.39802	39.8	.95215	7.6	.03785
.568	.36065	47.4	.39842	39.8	.95223	7.6	.03777
.569	.36112	47.4	.39883	39.8	.95231	7.5	.03769
1.570	0.36160	47.4	0.39923	39.8	9.95238	7.5	0.03762
.571	.36207	47.4	.39961	39.8	.95246	7.5	.03754
.572	.36254	47.3	.40001	39.8	.95253	7.5	.03747
.573	.36302	47.3	.40041	39.8	.95261	7.5	.03739
.574	.36349	47.3	.40081	39.9	.95268	7.5	.03732
1.575	0.36396	47.3	0.40121	39.9	9.95276	7.5	0.03724
.576	.36444	47.3	.40161	39.9	.95283	7.4	.03717
.577	.36491	47.3	.40200	39.9	.95291	7.4	.03709
.578	.36538	47.3	.40240	39.9	.95298	7.4	.03702
.579	.36585	47.3	.40281	39.9	.95305	7.4	.03695
1.580	0.36633	47.3	0.40320	39.9	9.95313	7.4	0.03687
.581	.36680	47.3	.40360	39.9	.95320	7.4	.03680
.582	.36727	47.3	.40400	39.9	.95327	7.4	.03673
.583	.36775	47.3	.40440	39.9	.95335	7.3	.03665
.584	.36822	47.2	.40480	39.9	.95342	7.3	.03658
1.585	0.36869	47.2	0.40520	39.9	9.95349	7.3	0.03651
.586	.36916	47.2	.40560	39.9	.95357	7.3	.03643
.587	.36964	47.2	.40600	39.9	.95364	7.3	.03636
.588	.37011	47.2	.40639	39.9	.95371	7.3	.03629
.589	.37058	47.2	.40679	40.0	.95379	7.3	.03621
1.590	0.37105	47.2	0.40719	40.0	9.95386	7.2	0.03614
.591	.37152	47.2	.40759	40.0	.95393	7.2	.03607
.592	.37200	47.2	.40799	40.0	.95400	7.2	.03600
.593	.37247	47.2	.40839	40.0	.95407	7.2	.03593
.594	.37294	47.2	.40879	40.0	.95415	7.2	.03585
1.595	0.37341	47.2	0.40919	40.0	9.95423	7.2	0.03578
.596	.37388	47.2	.40959	40.0	.95429	7.2	.03571
.597	.37435	47.1	.40999	40.0	.95436	7.1	.03564
.598	.37482	47.1	.41039	40.0	.95443	7.1	.03557
.599	.37530	47.1	.41079	40.0	.95450	7.1	.03550
1.600	0.37577	47.1	0.41119	40.0	9.95457	7.1	0.03543
$u$	$\log \tan qd u$	$\omega F_0'$	$\log \sec qd u$	$\omega F_0'$	$\log \sin qd u$	$\omega F_0'$	$\log \csc qd u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.600	0.37577	47.1	0.41119	40.0	0.09452	7.1	0.03543
.601	.37624		.41150		.09465		.03545
.602	.37671		.41199		.09472		.03548
.603	.37718		.41239		.09479		.03551
.604	.37765		.41279	40.1	.09486	7.0	.03554
1.605	0.37812	47.1	0.41319	40.1	0.09493	7.0	0.03597
.606	.37859		.41360		.09500		.03599
.607	.37906		.41400		.09507		.03603
.608	.37953		.41440		.09514		.03606
.609	.38001		.41480		.09521		.03609
1.610	0.38048	47.0	0.41520	40.1	0.09528	7.0	0.03642
.611	.38095		.41560		.09535	6.9	.03645
.612	.38142		.41600		.09542		.03648
.613	.38189		.41640		.09548		.03652
.614	.38236		.41680		.09555		.03655
1.615	0.38283	47.0	0.41720	40.1	0.09562	6.9	0.03688
.616	.38330		.41761		.09569		.03691
.617	.38377		.41801		.09576		.03694
.618	.38424		.41841		.09583	6.8	.03697
.619	.38471		.41881		.09590		.03700
1.620	0.38518	47.0	0.41921	40.2	0.09597	6.8	0.03743
.621	.38565		.41961		.09604		.03745
.622	.38612		.42001		.09610		.03748
.623	.38659	46.9	.42042		.09617		.03751
.624	.38705		.42082		.09624		.03754
1.625	0.38752	46.9	0.42122	40.2	0.09630	6.7	0.03787
.626	.38799		.42162		.09637		.03790
.627	.38846		.42202		.09644		.03793
.628	.38893		.42243		.09651		.03796
.629	.38940		.42283		.09657		.03799
1.630	0.38987	46.9	0.42323	40.3	0.09664	6.7	0.03832
.631	.39034		.42363		.09671		.03835
.632	.39081		.42403		.09677		.03838
.633	.39128		.42444		.09684	6.6	.03841
.634	.39175		.42484		.09691		.03844
1.635	0.39221	46.9	0.42524	40.2	0.09697	6.6	0.03877
.636	.39268		.42564	40.3	.09704		.03879
.637	.39315	46.8	.42605		.09710		.03882
.638	.39362		.42645		.09717		.03885
.639	.39409		.42685		.09724		.03888
1.640	0.39456	46.8	0.42725	40.3	0.09730	6.5	0.03921
.641	.39502		.42766		.09737		.03924
.642	.39549		.42806		.09743		.03927
.643	.39596		.42846		.09750		.03930
.644	.39643		.42887		.09756		.03933
1.645	0.39690	46.8	0.42927	40.3	0.09763	6.5	0.03966
.646	.39736		.42967		.09769		.03969
.647	.39783		.43008		.09776		.03972
.648	.39830		.43048		.09782	6.4	.03975
.649	.39877		.43088		.09788		.03978
1.650	0.39923	46.8	0.43129	40.3	0.09795	6.4	0.04011
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.050	0.39923	46.3	0.43129	46.3	9.96795	6.1	0.03205
.051	.399270	46.7	.43166		.96801		.03199
.052	.399317		.43200	46.1	.96808		.03192
.053	.399364		.43235		.96814		.03186
.054	.399410		.43269		.96820		.03180
1.055	0.399457	46.7	0.43303	46.1	9.96827	6.1	0.03173
.056	.399504		.43337		.96833	6.3	.03167
.057	.399550		.43371		.96840		.03160
.058	.399597		.43405		.96846		.03154
.059	.399644		.43439		.96852		.03148
1.060	0.399691	46.7	0.43473	46.1	9.96858	6.3	0.03142
.061	.399737		.43507		.96865		.03135
.062	.399784		.43541		.96871		.03129
.063	.399831		.43575		.96877		.03123
.064	.399877		.43609		.96883	6.2	.03117
1.065	0.399924	46.7	0.43643	46.1	9.96890	6.2	0.03110
.066	.399971	46.6	.43677		.96896		.03104
.067	.399917		.43711		.96902		.03098
.068	.399964		.43745		.96908		.03092
.069	.399911		.43779	46.5	.96915		.03085
1.070	0.399957	46.6	0.43813	46.5	9.96921	6.2	0.03079
.071	.399904		.43847		.96927		.03073
.072	.399950		.43881		.96933	6.1	.03067
.073	.399997		.43915		.96939		.03061
.074	.399944		.43949		.96945		.03055
1.075	0.399990	46.6	0.43983	46.5	9.96951	6.1	0.03049
.076	.399937		.44017		.96957		.03043
.077	.399984		.44051		.96963		.03036
.078	.399930		.44085		.96969		.03030
.079	.399977		.44119		.96976		.03024
1.080	0.399924	46.6	0.44153	46.5	9.96982	6.0	0.03018
.081	.399970	46.5	.44187		.96988		.03012
.082	.399916		.44221		.96994		.03006
.083	.399963		.44255		.97000		.03000
.084	.399909		.44289		.97006		.02994
1.085	0.399956	46.5	0.44323	46.5	9.97012	6.0	0.02988
.086	.399903		.44357		.97018		.02982
.087	.399949		.44391	46.6	.97024		.02976
.088	.399995		.44425		.97030	5.9	.02970
.089	.399942		.44459		.97036		.02964
1.090	0.399988	46.5	0.44493	46.6	9.97042	5.9	0.02958
.091	.399935		.44527		.97047		.02953
.092	.399981		.44561		.97053		.02947
.093	.399928		.44595		.97059		.02941
.094	.399974		.44629		.97065		.02935
1.095	0.399921	46.5	0.44663	46.6	9.97071	5.9	0.02929
.096	.399967		.44697		.97077		.02923
.097	.399914	46.4	.44731		.97083	5.8	.02917
.098	.399960		.44765		.97089		.02911
.099	.399907		.44799		.97094		.02906
1.700	0.42253	46.4	0.45153	46.6	9.97100	5.8	0.02900
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.700	0.42253	46.4	0.45153	40.6	9.971001	5.38	0.029000
.701	.42289		.45193		.971004		.028991
.702	.42336		.45234		.971112		.028983
.703	.42392		.45275		.971188		.028975
.704	.42439		.45315		.971223		.028967
1.705	0.42485	46.4	0.45356	40.7	9.97139	5.37	0.028971
.706	.42531		.45397		.971335		.028965
.707	.42578		.45437		.971341		.028959
.708	.42624		.45478		.971406		.028954
.709	.42671		.45519		.971452		.028948
1.710	0.42717	46.4	0.45559	40.7	9.97158	5.37	0.028943
.711	.42763		.45600		.971603		.028937
.712	.42810		.45641		.971609		.028931
.713	.42856	46.3	.45681		.971775		.028925
.714	.42902		.45722		.971800	5.36	.028920
1.715	0.42949	46.3	0.45763	40.7	9.971881	5.36	0.028914
.716	.42995		.45803		.971902		.028908
.717	.43041		.45844		.971907		.028903
.718	.43088		.45885		.972003		.028897
.719	.43134		.45926		.972008		.028892
1.720	0.43180	46.3	0.45966	40.7	9.972114	5.36	0.028886
.721	.43227		.46007		.972230		.028880
.722	.43273		.46048		.972235		.028875
.723	.43319		.46089		.972311	5.35	.028869
.724	.43365		.46129	40.8	.972336		.028864
1.725	0.43412	46.3	0.46170	40.8	9.972433	5.35	0.028858
.726	.43458		.46211		.972437		.028853
.727	.43504		.46252		.972533		.028847
.728	.43551		.46292		.972558		.028842
.729	.43597		.46333		.972603		.028836
1.730	0.43643	46.3	0.46374	40.8	9.972690	5.35	0.028831
.731	.43689		.46415		.972725		.028825
.732	.43736		.46455		.972800	5.34	.028820
.733	.43782		.46495		.972835		.028815
.734	.43828		.46537		.972901		.028809
1.735	0.43874	46.2	0.46578	40.8	9.972990	5.34	0.028804
.736	.43920		.46619		.973024		.028798
.737	.43967		.46660		.973097		.028793
.738	.44013		.46700		.973113		.028787
.739	.44059		.46741		.973188		.028782
1.740	0.44105	46.2	0.46782	40.8	9.973233	5.34	0.028777
.741	.44151		.46823		.973239	5.33	.028771
.742	.44198		.46864		.973311		.028766
.743	.44244		.46905		.973339		.028761
.744	.44290		.46945	40.9	.973445		.028755
1.745	0.44336	46.2	0.46986	40.9	9.97350	5.33	0.028750
.746	.44382		.47027		.973555		.028745
.747	.44428		.47068		.973590		.028740
.748	.44475	46.1	.47109		.973666		.028734
.749	.44521		.47150		.973721		.028729
1.750	0.44567	46.1	0.47191	40.9	9.973766	5.33	0.028724
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.750	0.44392	46.1	0.47191	40.9	9.97376	5.3	0.02624
.751	0.44613		0.47431		9.97382	5.2	0.02618
.752	0.44839		0.47672		9.97387		0.02613
.753	0.45065		0.47913		9.97392		0.02608
.754	0.45291		0.48154		9.97397		0.02603
1.755	0.45517	46.1	0.48395	40.9	9.97402	5.2	0.02598
.756	0.45744		0.48636		9.97408		0.02592
.757	0.45970		0.48877		9.97413		0.02587
.758	0.46196		0.49118		9.97418		0.02582
.759	0.46423		0.49359		9.97423		0.02577
1.760	0.46648	46.1	0.49600	40.9	9.97428	5.1	0.02572
.761	0.46874		0.49841		9.97433		0.02567
.762	0.47100		0.50082		9.97439		0.02561
.763	0.47326		0.50323		9.97444		0.02556
.764	0.47552		0.50564	41.0	9.97449		0.02551
1.765	0.47778	46.1	0.50805	41.0	9.97454	5.1	0.02546
.766	0.48004	46.0	0.51046		9.97459		0.02541
.767	0.48230		0.51287		9.97464		0.02536
.768	0.48456		0.51528		9.97469		0.02531
.769	0.48682		0.51769		9.97474		0.02526
1.770	0.48908	46.0	0.52010	41.0	9.97479	5.0	0.02521
.771	0.49134		0.52251		9.97484		0.02516
.772	0.49360		0.52492		9.97489		0.02511
.773	0.49586		0.52733		9.97494		0.02506
.774	0.49812		0.52974		9.97499		0.02501
1.775	0.50038	46.0	0.53215	41.0	9.97504	5.0	0.02496
.776	0.50264		0.53456		9.97509		0.02491
.777	0.50490		0.53697		9.97514		0.02486
.778	0.50716		0.53938		9.97519		0.02481
.779	0.50942		0.54179		9.97524		0.02476
1.780	0.51168	46.0	0.54420	41.0	9.97529	4.9	0.02471
.781	0.51394		0.54661		9.97534		0.02466
.782	0.51620		0.54902		9.97539		0.02461
.783	0.51846		0.55143		9.97544		0.02456
.784	0.52072		0.55384		9.97549		0.02451
1.785	0.52298	45.9	0.55625	41.1	9.97554	4.9	0.02446
.786	0.52524		0.55866		9.97559		0.02441
.787	0.52750		0.56107		9.97564		0.02436
.788	0.52976		0.56348		9.97569		0.02431
.789	0.53202		0.56589		9.97573		0.02427
1.790	0.53428	45.9	0.56830	41.1	9.97578	4.8	0.02422
.791	0.53654		0.57071		9.97583		0.02417
.792	0.53880		0.57312		9.97588		0.02412
.793	0.54106		0.57553		9.97593		0.02407
.794	0.54332		0.57794		9.97597		0.02403
1.795	0.54558	45.9	0.58035	41.1	9.97602	4.8	0.02398
.796	0.54784		0.58276		9.97607		0.02393
.797	0.55010		0.58517		9.97612		0.02388
.798	0.55236		0.58758		9.97617		0.02383
.799	0.55462		0.59000		9.97621		0.02379
1.800	0.55687	45.9	0.59241	41.1	9.97626	4.8	0.02374
$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$



# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.800	0.46807	45.9	0.49241	41.1	9.97630	4.3	0.02374
.801	.46913		.49282		.97631	4.2	.02390
.802	.46959		.49323		.97630		.02364
.803	.47004		.49364		.97610		.02360
.804	.47050	45.8	.49405		.97615		.02335
1.805	0.47095	45.8	0.49446	41.1	9.97650	4.2	0.02350
.806	.47142		.49487		.97651		.02340
.807	.47188		.49529	41.2	.97650		.02341
.808	.47234		.49570		.97660		.02330
.809	.47279		.49611		.97663		.02333
1.810	0.47325	45.8	0.49652	41.2	9.97693	4.2	0.02327
.811	.47371		.49693		.97698	4.0	.02322
.812	.47417		.49734		.97682		.02318
.813	.47463		.49775		.97687		.02313
.814	.47509		.49817		.97690		.02308
1.815	0.47554	45.8	0.49858	41.2	9.97690	4.6	0.02304
.816	.47600		.49899		.97701		.02299
.817	.47646		.49940		.97705		.02295
.818	.47692		.49982		.97710		.02281
.819	.47737		.50023		.97715		.02285
1.820	0.47783	45.8	0.50064	41.2	9.97710	4.6	0.02281
.821	.47829		.50105		.97721		.02276
.822	.47875		.50146		.97728	4.5	.02272
.823	.47921		.50188		.97733		.02269
.824	.47966		.50229		.97737		.02264
1.825	0.48012	45.7	0.50270	41.2	9.97742	4.5	0.02258
.826	.48058		.50311		.97749		.02254
.827	.48104		.50353		.97751		.02249
.828	.48149		.50394		.97755		.02245
.829	.48195		.50435		.97760		.02240
1.830	0.48241	45.7	0.50476	41.3	9.97764	4.5	0.02240
.831	.48286		.50518		.97769		.02231
.832	.48332		.50559		.97773		.02227
.833	.48378		.50600		.97778	4.4	.02222
.834	.48424		.50641		.97782		.02218
1.835	0.48469	45.7	0.50683	41.3	9.97787	4.4	0.02213
.836	.48515		.50724		.97791		.02209
.837	.48561		.50765		.97796		.02204
.838	.48606		.50806		.97800		.02200
.839	.48652		.50848		.97804		.02196
1.840	0.48698	45.7	0.50889	41.3	9.97809	4.4	0.02191
.841	.48743		.50930		.97813		.02187
.842	.48789		.50972		.97817		.02183
.843	.48835		.51013		.97822		.02178
.844	.48880		.51054		.97826	4.3	.02174
1.845	0.48926	45.7	0.51096	41.3	9.97831	4.3	0.02169
.846	.48972	45.6	.51137		.97835		.02165
.847	.49017		.51178		.97839		.02161
.848	.49063		.51219		.97843		.02157
.849	.49109		.51261		.97848		.02152
1.850	0.49154	45.6	0.51302	41.3	9.97852	4.3	0.02148
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

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# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.850	0.49154	45.6	0.51302	41.3	9.97852	4.3	0.02148
.851	.49200		.51343		.97856		.02144
.852	.49246		.51385		.97861		.02139
.853	.49291		.51426		.97865		.02135
.854	.49337		.51468	41.4	.97869		.02131
1.855	0.49382	45.6	0.51509	41.4	9.97873	4.3	0.02127
.856	.49428		.51550		.97878	4.2	.02122
.857	.49474		.51592		.97882		.02118
.858	.49519		.51633		.97886		.02114
.859	.49565		.51674		.97890		.02110
1.860	0.49610	45.6	0.51716	41.4	9.97895	4.2	0.02105
.861	.49656		.51757		.97899		.02101
.862	.49702		.51798		.97903		.02097
.863	.49747		.51840		.97907		.02093
.864	.49793		.51881		.97911		.02089
1.865	0.49838	45.6	0.51923	41.4	9.97916	4.2	0.02084
.866	.49884		.51964		.97920		.02080
.867	.49929		.52005		.97924		.02076
.868	.49975		.52047		.97928	4.1	.02072
.869	.50020	45.5	.52088		.97932		.02068
1.870	0.50066	45.5	0.52130	41.4	9.97936	4.1	0.02064
.871	.50112		.52171		.97940		.02060
.872	.50157		.52212		.97945		.02055
.873	.50203		.52254		.97949		.02051
.874	.50248		.52295		.97953		.02047
1.875	0.50294	45.5	0.52337	41.4	9.97957	4.1	0.02043
.876	.50339		.52378		.97961		.02039
.877	.50385		.52420		.97965		.02035
.878	.50430		.52461		.97969		.02031
.879	.50476		.52503		.97973		.02027
1.880	0.50521	45.5	0.52544	41.5	9.97977	4.0	0.02023
.881	.50567		.52585		.97981		.02019
.882	.50612		.52627		.97985		.02015
.883	.50658		.52668		.97989		.02011
.884	.50703		.52710		.97993		.02007
1.885	0.50749	45.5	0.52751	41.5	9.97997	4.0	0.02003
.886	.50794		.52793		.98001		.01999
.887	.50840		.52834		.98005		.01995
.888	.50885		.52876		.98009		.01991
.889	.50931		.52917		.98013		.01987
1.890	0.50976	45.5	0.52959	41.5	9.98017	4.0	0.01983
.891	.51021		.53000		.98021		.01979
.892	.51067	45.4	.53042		.98025		.01975
.893	.51112		.53083		.98029	3.9	.01971
.894	.51158		.53125		.98033		.01967
1.895	0.51203	45.4	0.53166	41.5	9.98037	3.9	0.01963
.896	.51249		.53208		.98041		.01959
.897	.51294		.53249		.98045		.01955
.898	.51340		.53291		.98049		.01951
.899	.51385		.53332		.98053		.01947
1.900	0.51430	45.4	0.53374	41.5	9.98057	3.9	0.01943
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.900	0.51430	45.4	0.53374	41.5	0.08057	3.9	0.01013
.901	.51476		.53415		.08060		.01010
.902	.51521		.53457		.08064		.01006
.903	.51567		.53498		.08068		.01002
.904	.51612		.53540		.08072		.01000
1.905	0.51657	45.4	0.53581	41.5	0.08076	3.8	0.01004
.906	.51703		.53623	41.6	.08080		.01000
.907	.51748		.53665		.08084		.01000
.908	.51794		.53706		.08087		.01003
.909	.51839		.53748		.08091		.01009
1.910	0.51884	45.4	0.53789	41.6	0.08095	3.8	0.01005
.911	.51930		.53831		.08099		.01001
.912	.51975		.53872		.08103		.01007
.913	.52020		.53914		.08106		.01004
.914	.52066		.53956		.08110		.01000
1.915	0.52111	45.4	0.53997	41.6	0.08114	3.8	0.01005
.916	.52157		.54039		.08118		.01004
.917	.52202	45.3	.54081		.08122		.01008
.918	.52247		.54122		.08125		.01005
.919	.52293		.54164		.08129	3.7	.01001
1.920	0.52338	45.3	0.54205	41.6	0.08133	3.7	0.01007
.921	.52383		.54247		.08137		.01003
.922	.52429		.54288		.08140		.01000
.923	.52474		.54330		.08144		.01006
.924	.52519		.54372		.08148		.01002
1.925	0.52565	45.3	0.54413	41.6	0.08151	3.7	0.01004
.926	.52610		.54455		.08155		.01005
.927	.52655		.54496		.08159		.01011
.928	.52700		.54538		.08162		.01008
.929	.52746		.54580		.08166		.01004
1.930	0.52791	45.3	0.54621	41.6	0.08170	3.7	0.01000
.931	.52836		.54663		.08173		.01007
.932	.52882		.54705		.08177	3.6	.01003
.933	.52927		.54746		.08181		.01000
.934	.52972		.54788	41.7	.08184		.01006
1.935	0.53018	45.3	0.54830	41.7	0.08188	3.6	0.01012
.936	.53063		.54871		.08192		.01008
.937	.53108		.54913		.08195		.01005
.938	.53153		.54955		.08199		.01001
.939	.53199		.54996		.08202		.01008
1.940	0.53244	45.3	0.55038	41.7	0.08206	3.6	0.01004
.941	.53289		.55080		.08210		.01000
.942	.53334		.55121		.08214		.01007
.943	.53380	45.2	.55163		.08217		.01003
.944	.53425		.55205		.08220		.01000
1.945	0.53470	45.2	0.55246	41.7	0.08224	3.6	0.01006
.946	.53515		.55288		.08227	3.5	.01002
.947	.53561		.55330		.08231		.01008
.948	.53606		.55371		.08235		.01004
.949	.53651		.55413		.08238		.01000
1.950	0.53696	45.2	0.55455	41.7	0.08242	3.5	0.01005
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
1.950	0.53606	-15.2	0.55455	41.7	9.98242	3.5	0.01758
.951	.53712		.55496		.98245		.01755
.952	.53787		.55538		.98249		.01751
.953	.53832		.55580		.98252		.01748
.954	.53877		.55622		.98256		.01744
1.955	0.53922	-15.2	0.55663	41.7	9.98259	3.5	0.01741
.956	.53968		.55705		.98263		.01737
.957	.54013		.55747		.98266		.01734
.958	.54058		.55788		.98269		.01731
.959	.54103		.55830		.98273		.01727
1.960	0.54148	-15.2	0.55872	41.7	9.98276	3.4	0.01724
.961	.54194		.55914		.98280		.01720
.962	.54239		.55955		.98283		.01717
.963	.54284		.55997		.98287		.01713
.964	.54329		.56039	41.8	.98290		.01710
1.965	0.54374	-15.2	0.56081	41.8	9.98294	3.4	0.01706
.966	.54419		.56122		.98297		.01703
.967	.54465		.56164		.98300		.01700
.968	.54510		.56206		.98304		.01696
.969	.54555		.56248		.98307		.01693
1.970	0.54600	-15.2	0.56290	41.8	9.98311	3.4	0.01689
.971	.54645	-15.1	.56331		.98314		.01686
.972	.54690		.56373		.98317		.01683
.973	.54736		.56415		.98321		.01679
.974	.54781		.56457		.98324		.01676
1.975	0.54826	-15.1	0.56498	41.8	9.98327	3.3	0.01673
.976	.54871		.56540		.98331		.01669
.977	.54916		.56582		.98334		.01666
.978	.54961		.56624		.98337		.01663
.979	.55005		.56666		.98341		.01659
1.980	0.55051	-15.1	0.56707	41.8	9.98344	3.3	0.01656
.981	.55097		.56749		.98347		.01653
.982	.55142		.56791		.98351		.01649
.983	.55187		.56833		.98354		.01646
.984	.55232		.56875		.98357		.01643
1.985	0.55277	-15.1	0.56916	41.8	9.98360	3.3	0.01640
.986	.55322		.56958		.98364		.01636
.987	.55367		.57000		.98367		.01633
.988	.55412		.57042		.98370		.01630
.989	.55457		.57084		.98374		.01626
1.990	0.55502	-15.1	0.57126	41.8	9.98377	3.2	0.01623
.991	.55547		.57167		.98380		.01620
.992	.55593		.57209		.98383		.01617
.993	.55638		.57251		.98387		.01613
.994	.55683		.57293		.98390		.01610
1.995	0.55728	-15.1	0.57335	41.9	9.98393	3.2	0.01607
.996	.55773		.57377		.98396		.01604
.997	.55818		.57419		.98399		.01601
.998	.55863		.57460		.98403		.01597
.999	.55908		.57502		.98406		.01594
2.000	0.55953	-15.0	0.57544	41.9	9.98409	3.2	0.01591
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.000	0.55953	45.0	0.57544	41.9	0.08199	3.1	0.00501
.001	.55998		.57586		.08192		.01588
.002	.56043		.57628		.08185		.02675
.003	.56088		.57670		.08178		.03762
.004	.56133		.57712		.08171		.04848
2.005	0.56178	45.0	0.57754	41.9	0.08163	3.1	0.01575
.006	.56223		.57795		.08156		.02662
.007	.56268		.57837		.08149		.03749
.008	.56313		.57879		.08141		.04836
.009	.56358		.57921		.08134		.05923
2.010	0.56403	45.0	0.57963	41.9	0.08126	3.1	0.01560
.011	.56448		.58005		.08119		.02647
.012	.56493		.58047		.08112		.03734
.013	.56538		.58089		.08105		.04821
.014	.56583		.58131		.08098		.05908
2.015	0.56628	45.0	0.58172	41.9	0.08090	3.1	0.01544
.016	.56673		.58214		.08083		.02631
.017	.56718		.58256		.08076		.03718
.018	.56763		.58298		.08069		.04805
.019	.56808		.58340		.08062		.05892
2.020	0.56853	45.0	0.58382	41.9	0.08054	3.1	0.01529
.021	.56898		.58424		.08047		.02616
.022	.56943		.58466		.08040		.03703
.023	.56988		.58508		.08033		.04790
.024	.57033		.58550		.08026		.05877
2.025	0.57078	45.0	0.58592	41.9	0.08018	3.1	0.01513
.026	.57123		.58634		.08011		.02600
.027	.57168		.58676		.08004		.03687
.028	.57213		.58718		.07997		.04774
.029	.57258		.58760		.07990		.05861
2.030	0.57303	45.0	0.58802	42.0	0.07982	3.1	0.01498
.031	.57348		.58844		.07975		.02585
.032	.57393		.58886		.07968		.03672
.033	.57438		.58927		.07961		.04759
.034	.57483		.58969		.07954		.05846
2.035	0.57528	44.9	0.59011	42.0	0.07946	3.1	0.01483
.036	.57573		.59053		.07939		.02570
.037	.57618		.59095		.07932		.03657
.038	.57663		.59137		.07925		.04744
.039	.57708		.59179		.07918		.05831
2.040	0.57753	44.9	0.59221	42.0	0.07910	3.1	0.01469
.041	.57797		.59263		.07903		.02556
.042	.57842		.59305		.07896		.03643
.043	.57887		.59347		.07889		.04730
.044	.57932		.59389		.07882		.05817
2.045	0.57977	44.9	0.59431	42.0	0.07874	3.1	0.01454
.046	.58022		.59473		.07867		.02543
.047	.58067		.59515		.07860		.03630
.048	.58112		.59557		.07853		.04717
.049	.58157		.59599		.07846		.05804
2.050	0.58202	44.9	0.59641	42.0	0.07838	3.1	0.01440
$u$	$\log \tan gd u$	$\omega F_0'$	$\log \sec gd u$	$\omega F_0'$	$\log \sin gd u$	$\omega F_0'$	$\log \csc gd u$

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.050	0.58202	44.9	0.59541	42.0	9.98560	2.9	0.01440
.051	.58246		.59583		.98563		.01437
.052	.58291		.59725		.98566		.01434
.053	.58336		.59767		.98569		.01431
.054	.58381		.59809		.98572		.01428
2.055	0.58426	44.9	0.59851	42.0	9.98575	2.9	0.01425
.056	.58471		.59893		.98578	2.8	.01422
.057	.58516		.59935		.98580		.01420
.058	.58561		.59977		.98583		.01417
.059	.58606		.60019		.98586		.01414
2.060	0.58650	44.9	0.60061	42.0	9.98589	2.8	0.01411
.061	.58695		.60104		.98592		.01408
.062	.58740		.60146		.98595		.01405
.063	.58785		.60188		.98597		.01403
.064	.58830		.60230	42.1	.98600		.01400
2.065	0.58875	44.8	0.60272	42.1	9.98603	2.8	0.01397
.066	.58920		.60314		.98606		.01394
.067	.58964		.60356		.98609		.01391
.068	.59009		.60398		.98611		.01389
.069	.59054		.60440		.98614		.01386
2.070	0.59099	44.8	0.60482	42.1	9.98617	2.8	0.01383
.071	.59144		.60524		.98620		.01380
.072	.59189		.60566		.98622		.01378
.073	.59233		.60608		.98625		.01375
.074	.59278		.60650		.98628	2.7	.01372
2.075	0.59323	44.8	0.60692	42.1	9.98631	2.7	0.01369
.076	.59368		.60734		.98633		.01367
.077	.59413		.60777		.98636		.01364
.078	.59457		.60819		.98639		.01361
.079	.59502		.60861		.98642		.01358
2.080	0.59547	44.8	0.60903	42.1	9.98644	2.7	0.01356
.081	.59592		.60945		.98647		.01353
.082	.59637		.60987		.98650		.01350
.083	.59681		.61029		.98652		.01348
.084	.59726		.61071		.98655		.01345
2.085	0.59771	44.8	0.61113	42.1	9.98658	2.7	0.01342
.086	.59816		.61155		.98660		.01340
.087	.59861		.61198		.98663		.01337
.088	.59905		.61240		.98666		.01334
.089	.59950		.61282		.98668		.01332
2.090	0.59995	44.8	0.61324	42.1	9.98671	2.7	0.01329
.091	.60040		.61366		.98674		.01326
.092	.60085		.61408		.98676	2.6	.01324
.093	.60129		.61450		.98679		.01321
.094	.60174		.61492		.98682		.01318
2.095	0.60219	44.8	0.61535	42.1	9.98684	2.6	0.01316
.096	.60264		.61577		.98687		.01313
.097	.60308		.61619		.98690		.01310
.098	.60353		.61661		.98692		.01308
.099	.60398		.61703		.98695		.01305
2.100	0.60443	44.8	0.61745	42.1	9.98697	2.6	0.01303
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sin u	$\omega F_0'$	log cos u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$
2.100	0.60443	44.8	0.61745	44.1	9.989007	2.6	0.01303
.101	.60487	44.7	.61787		.989000		.01300
.102	.60532		.61830	44.3	.989003		.01297
.103	.60577		.61872		.989005		.01295
.104	.60622		.61914		.989008		.01292
2.105	0.60666	44.7	0.61956	44.2	9.989210	2.6	0.01300
.106	.60711		.61998		.989213		.01287
.107	.60756		.62040		.989216		.01284
.108	.60801		.62083		.989218		.01281
.109	.60845		.62125		.989221		.01279
2.110	0.60890	44.7	0.62167	44.2	9.989223	2.6	0.01277
.111	.60935		.62209		.989226	2.5	.01274
.112	.60979		.62251		.989228		.01272
.113	.61024		.62293		.989231		.01269
.114	.61069		.62336		.989233		.01267
2.115	0.61114	44.7	0.62378	44.2	9.989236	2.5	0.01264
.116	.61158		.62420		.989238		.01261
.117	.61203		.62462		.989241		.01259
.118	.61248		.62504		.989243		.01257
.119	.61292		.62546		.989246		.01254
2.120	0.61337	44.7	0.62589	44.2	9.989248	2.5	0.01252
.121	.61382		.62631		.989251		.01249
.122	.61427		.62673		.989253		.01247
.123	.61471		.62715		.989256		.01244
.124	.61516		.62757		.989258		.01241
2.125	0.61561	44.7	0.62800	44.2	9.989261	2.5	0.01239
.126	.61605		.62842		.989263		.01237
.127	.61650		.62884		.989266		.01234
.128	.61695		.62926		.989268		.01232
.129	.61739		.62969		.989271		.01229
2.130	0.61784	44.7	0.63011	44.2	9.989273	2.5	0.01227
.131	.61829		.63053		.989276	2.4	.01224
.132	.61873		.63095		.989278		.01222
.133	.61918		.63137		.989281		.01219
.134	.61963		.63180		.989283		.01217
2.135	0.62007	44.7	0.63222	44.2	9.989285	2.4	0.01215
.136	.62052		.63264		.989288		.01212
.137	.62097		.63306		.989290		.01210
.138	.62141		.63349		.989293		.01207
.139	.62186		.63391		.989295		.01205
2.140	0.62231	44.6	0.63433	44.2	9.989298	2.4	0.01203
.141	.62275		.63475		.989300		.01200
.142	.62320		.63518		.989302		.01198
.143	.62365		.63560	44.3	.989305		.01195
.144	.62409		.63602		.989307		.01193
2.145	0.62454	44.6	0.63644	44.3	9.989310	2.4	0.01190
.146	.62498		.63687		.989312		.01188
.147	.62543		.63729		.989314		.01186
.148	.62588		.63771		.989317		.01183
.149	.62632		.63813		.989319		.01181
2.150	0.62677	44.6	0.63856	44.3	9.989321	2.4	0.01179
$u$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$\log \tanh u$	$\omega F_u'$	$\log \coth u$

SMITHSONIAN TABLES

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.150	0.62677	44,6	0.63856	42,3	9.98821	2,4	0.01179
.151	.62722		.63898		.98824		.01176
.152	.62766		.63940		.98826	2,3	.01174
.153	.62811		.63982		.98828		.01172
.154	.62855		.64025		.98831		.01169
2.155	0.62900	44,6	0.64067	42,3	9.98833	2,3	0.01167
.156	.62945		.64109		.98835		.01165
.157	.62989		.64152		.98838		.01162
.158	.63034		.64194		.98840		.01160
.159	.63079		.64236		.98842		.01158
2.160	0.63123	44,6	0.64278	42,3	9.98845	2,3	0.01155
.161	.63168		.64321		.98847		.01153
.162	.63212		.64363		.98849		.01151
.163	.63257		.64405		.98852		.01148
.164	.63302		.64448		.98854		.01146
2.165	0.63346	44,6	0.64490	42,3	9.98856	2,3	0.01144
.166	.63391		.64532		.98859		.01141
.167	.63435		.64574		.98861		.01139
.168	.63480		.64617		.98863		.01137
.169	.63524		.64659		.98865		.01135
2.170	0.63569	44,6	0.64701	42,3	9.98868	2,3	0.01132
.171	.63614		.64744		.98870		.01130
.172	.63658		.64786		.98872		.01128
.173	.63703		.64828		.98874		.01126
.174	.63747		.64871		.98877	2,2	.01123
2.175	0.63792	44,6	0.64913	42,3	9.98879	2,2	0.01121
.176	.63836		.64955		.98881		.01119
.177	.63881		.64998		.98883		.01117
.178	.63926		.65040		.98885		.01114
.179	.63970		.65082		.98888		.01112
2.180	0.64015	44,6	0.65125	42,3	9.98890	2,2	0.01110
.181	.64059		.65167		.98892		.01108
.182	.64104	44,5	.65209		.98894		.01106
.183	.64148		.65252		.98897		.01103
.184	.64193		.65294		.98899		.01101
2.185	0.64237	44,5	0.65336	42,3	9.98901	2,2	0.01099
.186	.64282		.65379		.98903		.01097
.187	.64326		.65421	42,4	.98905		.01095
.188	.64371		.65463		.98908		.01092
.189	.64416		.65506		.98910		.01090
2.190	0.64460	44,5	0.65548	42,4	9.98912	2,2	0.01088
.191	.64505		.65590		.98914		.01086
.192	.64549		.65633		.98916		.01084
.193	.64594		.65675		.98919		.01081
.194	.64638		.65718		.98921		.01079
2.195	0.64683	44,5	0.65760	42,4	9.98923	2,2	0.01077
.196	.64727		.65802		.98925		.01075
.197	.64772		.65845		.98927	2,1	.01073
.198	.64816		.65887		.98929		.01071
.199	.64861		.65929		.98931		.01069
2.200	0.64905	44,5	0.65972	42,4	9.98934	2,1	0.01066
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u



# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.200	0.64905	44.5	0.65972	42.4	0.08934	2.4	0.00000
.201	.64950		.66011		.08939		.00001
.202	.64994		.66056		.08943		.00002
.203	.65039		.66099		.08949		.00004
.204	.65083		.66141		.08954		.00005
2.205	0.65128	44.5	0.66184	42.4	0.08959	2.4	0.00050
.206	.65172		.66226		.08964		.00051
.207	.65217		.66268		.08968		.00052
.208	.65261		.66311		.08975		.00050
.209	.65306		.66353		.08983		.00047
2.210	0.65350	44.5	0.66396	42.4	0.08985	2.4	0.00105
.211	.65395		.66438		.08992		.00104
.212	.65439		.66480		.08999		.00103
.213	.65484		.66523		.09001		.00099
.214	.65528		.66565		.09004		.00097
2.215	0.65573	44.5	0.66608	42.4	0.09006	2.4	0.00135
.216	.65617		.66650		.09009		.00134
.217	.65662		.66692		.09013		.00131
.218	.65706		.66735		.09017		.00129
.219	.65751		.66777		.09023		.00127
2.220	0.65795	44.5	0.66820	42.4	0.09025	2.0	0.00125
.221	.65840		.66862		.09027		.00124
.222	.65884		.66905		.09030		.00121
.223	.65928		.66947		.09032		.00118
.224	.65973		.66989		.09034		.00116
2.225	0.66017	44.5	0.67032	42.4	0.09036	2.0	0.00114
.226	.66062		.67074		.09038		.00113
.227	.66106		.67117		.09040		.00110
.228	.66151	44.4	.67159		.09042		.00108
.229	.66195		.67202		.09044		.00106
2.230	0.66240	44.4	0.67244	42.4	0.09046	2.0	0.00104
.231	.66284		.67287		.09048		.00102
.232	.66328		.67329		.09050		.00100
.233	.66373		.67371		.09052		.00098
.234	.66417		.67414		.09054		.00097
2.235	0.66462	44.4	0.67456	42.4	0.09056	2.0	0.00094
.236	.66506		.67499		.09058		.00092
.237	.66551		.67541	42.5	.09060		.00090
.238	.66595		.67583		.09062		.00088
.239	.66640		.67625		.09064		.00086
2.240	0.66684	44.4	0.67668	42.5	0.09066	2.0	0.00084
.241	.66728		.67711		.09068		.00083
.242	.66773		.67753		.09070		.00081
.243	.66817		.67796		.09072		.00079
.244	.66862		.67838		.09074		.00077
2.245	0.66906	44.4	0.67881	42.5	0.09076	1.0	0.00075
.246	.66950		.67923		.09078		.00073
.247	.66995		.67965		.09080		.00071
.248	.67039		.68008		.09081		.00069
.249	.67084		.68051		.09083		.00067
2.250	0.67128	44.4	0.68093	42.5	0.09085	1.0	0.00065
$u$	$\log \tanh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
1.350	.07138	44.4	.68093	42.5	.99935	1.0	0.00065
1.351	.07173		.68130		.99937		.00063
1.352	.07207		.68178		.99939		.00061
1.353	.07241		.68220		.99941		.00059
1.354	.07276		.68263		.99943		.00057
1.355	.07310	44.4	.68305	42.5	.99945	1.0	0.00055
1.356	.07344		.68348		.99947		.00053
1.357	.07379		.68390		.99948		.00052
1.358	.07413		.68433		.99950		.00050
1.359	.07448		.68475		.99952		.00048
1.360	.07482	44.4	.68518	42.5	.99954	1.0	0.00046
1.361	.07516		.68560		.99956		.00044
1.362	.07551		.68603		.99958		.00042
1.363	.07585		.68645		.99960		.00040
1.364	.07620		.68688		.99962		.00038
1.365	.07654	44.4	.68730	42.5	.99964	1.0	0.00036
1.366	.07688		.68773		.99965		.00035
1.367	.07723		.68815		.99967		.00033
1.368	.07757		.68858		.99969		.00031
1.369	.07791		.68900		.99971		.00029
1.370	.07825	44.4	.68943	42.5	.99973	1.0	0.00027
1.371	.07860		.68985		.99975		.00025
1.372	.07894		.69028		.99977	1.8	.00023
1.373	.07928		.69070		.99978		.00022
1.374	.07963		.69113		.99980		.00020
1.375	.07997	44.4	.69156	42.5	.99982	1.8	0.00018
1.376	.08031		.69198		.99984		.00016
1.377	.08065		.69241		.99986		.00014
1.378	.08100		.69283		.99988		.00012
1.379	.08134	44.3	.69326	42.5	.99990	1.8	.00011
1.380	.08168		.69368		.99991		0.00009
1.381	.08202		.69411		.99993		.00007
1.382	.08236		.69453		.99995		.00005
1.383	.08270		.69496		.99997		.00003
1.384	.08304		.69538		.99998		.00002
1.385	.08338	44.3	.69581	42.5	.99999	1.8	0.00000
1.386	.08372		.69623		.99999		.00008
1.387	.08406		.69666		.99999		.00006
1.388	.08440		.69708		.99999		.00004
1.389	.08474		.69751		.99999		.00003
1.390	.08508	44.3	.69794	42.5	.99999	1.8	0.00001
1.391	.08542		.69836		.99999		.00000
1.392	.08576		.69879	42.6	.99999		.00007
1.393	.08610		.69921		.99999		.00005
1.394	.08644		.69964		.99999		.00004
1.395	.08678	44.3	.70006	42.6	.99999	1.8	0.00002
1.396	.08712		.70049		.99999		.00000
1.397	.08746		.70091		.99999		.00008
1.398	.08780		.70134		.99999		.00007
1.399	.08814		.70177		.99999	1.7	.00005
1.400	.08848	44.3	.70219	42.6	.99999	1.7	0.00003
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.300	0.69316	44.3	0.70210	42.6	9.99137	1.7	0.00863
.301	.69390		.70262		.99139		.00871
.302	.69435		.70301		.99130		.00870
.303	.69479		.70347		.99132		.00868
.304	.69523		.70389		.99134		.00880
2.305	0.69568	44.3	0.70432	42.6	9.99136	1.7	0.00891
.306	.69612		.70475		.99137		.00893
.307	.69656		.70517		.99139		.00894
.308	.69700		.70560		.99141		.00895
.309	.69745		.70602		.99142		.00898
2.310	0.69789	44.3	0.70645	42.6	9.99144	1.7	0.00895
.311	.69833		.70687		.99146		.00895
.312	.69878		.70730		.99148		.00895
.313	.69922		.70773		.99149		.00895
.314	.69966		.70815		.99151		.00894
2.315	0.70010	44.3	0.70858	42.6	9.99153	1.7	0.00897
.316	.70055		.70900		.99154		.00896
.317	.70099		.70943		.99156		.00896
.318	.70143		.70986		.99158		.00896
.319	.70188		.71028		.99159		.00896
2.320	0.70232	44.3	0.71071	42.6	9.99161	1.7	0.00896
.321	.70276		.71113		.99163		.00897
.322	.70320		.71156		.99164		.00896
.323	.70365		.71199		.99166		.00896
.324	.70409		.71241		.99168		.00896
2.325	0.70453	44.3	0.71284	42.6	9.99169	1.7	0.00896
.326	.70497		.71326		.99171		.00896
.327	.70542		.71369		.99173		.00896
.328	.70586		.71412		.99174		.00896
.329	.70630		.71454		.99176	1.6	.00896
2.330	0.70675	44.3	0.71497	42.6	9.99178	1.6	0.00896
.331	.70719		.71539		.99179		.00896
.332	.70763		.71582		.99181		.00896
.333	.70807		.71625		.99183		.00896
.334	.70852		.71667		.99184		.00896
2.335	0.70896	44.3	0.71710	42.6	9.99185	1.6	0.00896
.336	.70940	44.2	.71753		.99188		.00896
.337	.70984		.71795		.99189		.00896
.338	.71029		.71838		.99191		.00896
.339	.71073		.71880		.99192		.00896
2.340	0.71117	44.2	0.71923	42.6	9.99194	1.6	0.00896
.341	.71161		.71966		.99196		.00896
.342	.71205		.72008		.99197		.00896
.343	.71250		.72051		.99199		.00896
.344	.71294		.72094		.99200		.00896
2.345	0.71338	44.2	0.72136	42.6	9.99202	1.6	0.00896
.346	.71382		.72179		.99204		.00896
.347	.71427		.72221		.99205		.00896
.348	.71471		.72264		.99207		.00896
.349	.71515		.72307		.99208		.00896
2.350	0.71559	44.2	0.72349	42.6	9.99210	1.6	0.00896
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.350	0.71559	44.2	0.72349	42.6	9.99210	1.6	0.00790
.351	.71604		.72392		.99212		.00788
.352	.71648		.72435		.99213		.00787
.353	.71692		.72477	42.7	.99215		.00785
.354	.71736		.72520		.99216		.00784
2.355	0.71781	44.2	0.72563	42.7	9.99218	1.6	0.00782
.356	.71825		.72605		.99219		.00781
.357	.71869		.72648		.99221		.00779
.358	.71913		.72691		.99223		.00777
.359	.71957		.72733		.99224		.00776
2.360	0.72002	44.2	0.72776	42.7	9.99226	1.5	0.00774
.361	.72046		.72819		.99227		.00773
.362	.72090		.72861		.99229		.00771
.363	.72134		.72904		.99230		.00770
.364	.72178		.72947		.99232		.00768
2.365	0.72223	44.2	0.72989	42.7	9.99233	1.5	0.00767
.366	.72267		.73032		.99235		.00765
.367	.72311		.73075		.99236		.00764
.368	.72355		.73117		.99238		.00762
.369	.72399		.73160		.99239		.00761
2.370	0.72444	44.2	0.73203	42.7	9.99241	1.5	0.00759
.371	.72488		.73245		.99242		.00758
.372	.72532		.73288		.99244		.00756
.373	.72576		.73331		.99245		.00755
.374	.72620		.73373		.99247		.00753
2.375	0.72665	44.2	0.73416	42.7	9.99249	1.5	0.00751
.376	.72709		.73459		.99250		.00750
.377	.72753		.73501		.99252		.00748
.378	.72797		.73544		.99253		.00747
.379	.72841		.73587		.99254		.00746
2.380	0.72885	44.2	0.73630	42.7	9.99256	1.5	0.00744
.381	.72930		.73672		.99257		.00743
.382	.72974		.73715		.99259		.00741
.383	.73018		.73758		.99260		.00740
.384	.73062		.73800		.99262		.00738
2.385	0.73106	44.2	0.73843	42.7	9.99263	1.5	0.00737
.386	.73151		.73886		.99265		.00735
.387	.73195		.73928		.99266		.00734
.388	.73239		.73971		.99268		.00732
.389	.73283		.74014		.99269		.00731
2.390	0.73327	44.2	0.74056	42.7	9.99271	1.5	0.00729
.391	.73371		.74099		.99272		.00728
.392	.73416		.74142		.99274		.00726
.393	.73460		.74185		.99275	1.4	.00725
.394	.73504		.74227		.99277		.00723
2.395	0.73548	44.2	0.74270	42.7	9.99278	1.4	0.00722
.396	.73592		.74313		.99279		.00721
.397	.73636		.74355		.99281		.00719
.398	.73680		.74398		.99282		.00718
.399	.73725		.74441		.99284		.00716
2.400	0.73769	44.2	0.74484	42.7	9.99285	1.4	0.00715
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\infty F_u'$	log cosh u	$\infty F_u'$	log tanh u	$\infty F_u'$	log coth u
2.400	0.73760	44.2	0.74481	44.7	9.00385	1.1	0.00715
.401	.73813	44.1	.74530		.00387		.00713
.402	.73857		.74569		.00388		.00712
.403	.73901		.74612		.00389		.00711
.404	.73945		.74655		.00391		.00709
2.405	0.73990	44.1	0.74697	44.7	9.00393	1.1	0.00708
.406	.74034		.74740		.00394		.00706
.407	.74078		.74783		.00395		.00705
.408	.74122		.74825		.00397		.00703
.409	.74166		.74868		.00398		.00702
2.410	0.74210	44.1	0.74911	44.7	9.00399	1.1	0.00701
.411	.74254		.74954		.00401		.00699
.412	.74298		.74995		.00402		.00698
.413	.74343		.75039		.00404		.00696
.414	.74387		.75082		.00405		.00695
2.415	0.74431	44.1	0.75125	44.7	9.00396	1.1	0.00694
.416	.74475		.75167		.00398		.00692
.417	.74519		.75210		.00399		.00691
.418	.74563		.75253		.00400		.00690
.419	.74607		.75296		.00402		.00688
2.420	0.74652	44.1	0.75338	44.7	9.00393	1.1	0.00687
.421	.74696		.75381		.00395		.00685
.422	.74740		.75424	44.8	.00396		.00684
.423	.74784		.75467		.00397		.00683
.424	.74828		.75509		.00399		.00681
2.425	0.74872	44.1	0.75552	44.8	9.00394	1.1	0.00680
.426	.74916		.75595		.00396		.00679
.427	.74960		.75638		.00397		.00677
.428	.75004		.75680		.00399		.00676
.429	.75049		.75723		.00400	1.3	.00675
2.430	0.75093	44.1	0.75766	44.8	9.00397	1.1	0.00674
.431	.75137		.75809		.00398		.00673
.432	.75181		.75851		.00399		.00672
.433	.75225		.75894		.00401		.00670
.434	.75269		.75937		.00402		.00668
2.435	0.75313	44.1	0.75980	44.8	9.00398	1.3	0.00667
.436	.75357		.76022		.00399		.00665
.437	.75401		.76065		.00400		.00664
.438	.75445		.76108		.00402		.00663
.439	.75490		.76151		.00403		.00661
2.440	0.75534	44.1	0.76194	44.8	9.00399	1.3	0.00660
.441	.75578		.76236		.00401		.00659
.442	.75622		.76279		.00403		.00657
.443	.75666		.76322		.00404		.00656
.444	.75710		.76365		.00405		.00655
2.445	0.75754	44.1	0.76407	44.8	9.00402	1.3	0.00654
.446	.75798		.76450		.00403		.00652
.447	.75842		.76493		.00405		.00651
.448	.75886		.76536		.00406		.00649
.449	.75930		.76579		.00407		.00648
2.450	0.75975	44.1	0.76621	44.8	9.00403	1.3	0.00647
u	log tanh u	$\infty F_u'$	log coth u	$\infty F_u'$	log sinh u	$\infty F_u'$	log cosh u

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# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_u'$	log cosh u	$\omega F_u'$	log tanh u	$\omega F_u'$	log coth u
2.450	0.75975	44.1	0.76621	42.8	9.99353	1.3	0.00647
2.451	.76019		.76664		.99354		.00646
2.452	.76063		.76707		.99356		.00644
2.453	.76107		.76750		.99357		.00643
2.454	.76151		.76793		.99358		.00642
2.455	0.76195	44.1	0.76835	42.8	9.99360	1.3	0.00640
2.456	.76239		.76878		.99361		.00639
2.457	.76283		.76921		.99362		.00638
2.458	.76327		.76964		.99363		.00637
2.459	.76371		.77006		.99365		.00635
2.460	0.76415	44.1	0.77049	42.8	9.99366	1.3	0.00634
2.461	.76459		.77092		.99367		.00633
2.462	.76503		.77135		.99369		.00631
2.463	.76547		.77178		.99370		.00630
2.464	.76592		.77220		.99371		.00629
2.465	0.76636	44.1	0.77263	42.8	9.99372	1.3	0.00628
2.466	.76680		.77306		.99374		.00625
2.467	.76724		.77349		.99375		.00625
2.468	.76768		.77392		.99376	1.2	.00624
2.469	.76812		.77435		.99377		.00623
2.470	0.76856	44.1	0.77477	42.8	9.99379	1.2	0.00621
2.471	.76900		.77520		.99380		.00620
2.472	.76944		.77563		.99381		.00619
2.473	.76988		.77606		.99382		.00618
2.474	.77032		.77649		.99384		.00616
2.475	0.77076	44.0	0.77691	42.8	9.99385	1.2	0.00615
2.476	.77120		.77734		.99386		.00614
2.477	.77164		.77777		.99387		.00613
2.478	.77208		.77820		.99388		.00612
2.479	.77252		.77863		.99390		.00610
2.480	0.77296	44.0	0.77905	42.8	9.99391	1.2	0.00609
2.481	.77340		.77948		.99392		.00608
2.482	.77384		.77991		.99393		.00607
2.483	.77428		.78034		.99394		.00606
2.484	.77473		.78077		.99396		.00604
2.485	0.77517	44.0	0.78120	42.8	9.99397	1.2	0.00603
2.486	.77561		.78163		.99398		.00602
2.487	.77605		.78205		.99399		.00601
2.488	.77649		.78248		.99401		.00599
2.489	.77693		.78292		.99402		.00598
2.490	0.77737	44.0	0.78334	42.8	9.99403	1.2	0.00597
2.491	.77781		.78377		.99404		.00596
2.492	.77825		.78420		.99405		.00595
2.493	.77869		.78462		.99406		.00594
2.494	.77913		.78505		.99408		.00592
2.495	0.77957	44.0	0.78548	42.8	9.99409	1.2	0.00591
2.496	.78001		.78591		.99410		.00590
2.497	.78045		.78634		.99411		.00589
2.498	.78089		.78677		.99412		.00588
2.499	.78133		.78719		.99414		.00586
2.500	0.78177	44.0	0.78762	42.8	9.99415	1.2	0.00585
u	log tan gd u	$\omega F_u'$	log sec gd u	$\omega F_u'$	log sin gd u	$\omega F_u'$	log csc gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.500	0.78177	44.0	0.78762	43.8	9.99415	1.2	0.00585
.501	.78221		.78805		.99416		.00584
.502	.78265		.78848	43.9	.99417		.00583
.503	.78309		.78891		.99418		.00582
.504	.78353		.78934		.99419		.00581
2.505	0.78397	44.0	0.78977	43.9	9.99421	1.2	0.00579
.506	.78441		.79019		.99422		.00578
.507	.78485		.79062		.99423		.00577
.508	.78529		.79105		.99424		.00576
.509	.78573		.79148		.99425	1.1	.00575
2.510	0.78617	44.0	0.79191	43.9	9.99426	1.1	0.00574
.511	.78661		.79234		.99427		.00573
.512	.78705		.79277		.99429		.00572
.513	.78749		.79319		.99430		.00570
.514	.78793		.79362		.99431		.00569
2.515	0.78837	44.0	0.79405	43.9	9.99432	1.1	0.00568
.516	.78881		.79448		.99433		.00567
.517	.78925		.79491		.99434		.00566
.518	.78969		.79534		.99435		.00565
.519	.79013		.79577		.99437		.00564
2.520	0.79057	44.0	0.79619	43.9	9.99438	1.1	0.00562
.521	.79101		.79662		.99439		.00561
.522	.79145		.79705		.99440		.00560
.523	.79189		.79748		.99441		.00559
.524	.79233		.79791		.99442		.00558
2.525	0.79277	44.0	0.79834	43.9	9.99443	1.1	0.00557
.526	.79321		.79877		.99444		.00556
.527	.79365		.79920		.99446		.00554
.528	.79409		.79962		.99447		.00553
.529	.79453		.80005		.99448		.00552
2.530	0.79497	44.0	0.80048	43.9	9.99449	1.1	0.00551
.531	.79541		.80091		.99450		.00550
.532	.79585		.80134		.99451		.00549
.533	.79629		.80177		.99452		.00548
.534	.79673		.80220		.99453		.00547
2.535	0.79717	44.0	0.80263	43.9	9.99454	1.1	0.00546
.536	.79761		.80306		.99455		.00545
.537	.79805		.80348		.99456		.00544
.538	.79849		.80391		.99458		.00542
.539	.79893		.80434		.99459		.00541
2.540	0.79937	44.0	0.80477	43.9	9.99460	1.1	0.00540
.541	.79981		.80520		.99461		.00539
.542	.80025		.80563		.99462		.00538
.543	.80069		.80606		.99463		.00537
.544	.80113		.80649		.99464		.00536
2.545	0.80157	44.0	0.80692	43.9	9.99465	1.1	0.00535
.546	.80201		.80734		.99466		.00534
.547	.80245		.80777		.99467		.00533
.548	.80289		.80820		.99468		.00532
.549	.80333		.80863		.99469		.00531
2.550	0.80377	44.0	0.80906	43.9	9.99470	1.1	0.00530
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

SMITHSONIAN TABLES

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.550	0.80377	44.0	0.80305	42.9	9.99470	1.1	0.00530
.551	.80440		.80369		.99471		.00529
.552	.80504		.80432		.99473		.00527
.553	.80568		.80495		.99474		.00526
.554	.80632		.80558		.99475		.00525
2.555	0.80696	44.0	0.81121	42.9	9.99476	1.0	0.00524
.556	.80760		.81164		.99477		.00523
.557	.80824		.81206		.99478		.00522
.558	.80888		.81249		.99479		.00521
.559	.80952		.81292		.99480		.00520
2.560	0.80816	44.0	0.81335	42.9	9.99481	1.0	0.00519
.561	.80880		.81378		.99482		.00518
.562	.80944	43.9	.81421		.99483		.00517
.563	.80908		.81464		.99484		.00516
.564	.80972		.81507		.99485		.00515
2.565	0.81036	43.9	0.81550	42.9	9.99486	1.0	0.00514
.566	.81080		.81593		.99487		.00513
.567	.81144		.81636		.99488		.00512
.568	.81168		.81678		.99489		.00511
.569	.81212		.81721		.99490		.00510
2.570	0.81256	43.9	0.81764	42.9	9.99491	1.0	0.00509
.571	.81300		.81807		.99492		.00508
.572	.81343		.81850		.99493		.00507
.573	.81387		.81893		.99494		.00506
.574	.81431		.81936		.99495		.00505
2.575	0.81475	43.9	0.81979	42.9	9.99496	1.0	0.00504
.576	.81519		.82022		.99497		.00503
.577	.81563		.82065		.99498		.00502
.578	.81607		.82108		.99499		.00501
.579	.81651		.82151		.99500		.00500
2.580	0.81695	43.9	0.82194	42.9	9.99501	1.0	0.00499
.581	.81739		.82237		.99502		.00498
.582	.81783		.82279		.99503		.00497
.583	.81827		.82322		.99504		.00496
.584	.81871		.82365		.99505		.00495
2.585	0.81915	43.9	0.82408	42.9	9.99506	1.0	0.00494
.586	.81958		.82451		.99507		.00493
.587	.82002		.82494		.99508		.00492
.588	.82046		.82537		.99509		.00491
.589	.82090		.82580		.99510		.00490
2.590	0.82134	43.9	0.82623	42.9	9.99511	1.0	0.00489
.591	.82178		.82666		.99512		.00488
.592	.82221		.82709		.99513		.00487
.593	.82266		.82752		.99514		.00486
.594	.82310		.82795		.99515		.00485
2.595	0.82354	43.9	0.82838	42.9	9.99516	1.0	0.00484
.596	.82398		.82881		.99517		.00483
.597	.82442		.82924	43.0	.99518		.00482
.598	.82485		.82967		.99519		.00481
.599	.82529		.83010		.99520		.00480
2.600	0.82573	43.9	0.83052	43.0	9.99521	1.0	0.00479
$u$	$\log \tanh u$	$\omega F_0'$	$\log \sec u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$



# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$\log \tanh u$	$\infty F_0'$	$\log \coth u$
2.600	0.82573	43.9	0.83052	43.0	0.00522	1.0	0.00170
.601	.82617		.83095		.00522		.00173
.602	.82661		.83138		.00523		.00177
.603	.82705		.83181		.00524		.00179
.604	.82749		.83224		.00525		.00175
2.605	0.82793	43.9	0.83267	43.0	0.00526	0.9	0.00174
.606	.82837		.83310		.00527		.00173
.607	.82881		.83353		.00527		.00173
.608	.82925		.83396		.00528		.00172
.609	.82968		.83439		.00529		.00171
2.610	0.83012	43.9	0.83482	43.0	0.00530	0.9	0.00170
.611	.83056		.83525		.00531		.00169
.612	.83100		.83568		.00532		.00168
.613	.83144		.83611		.00533		.00167
.614	.83188		.83654		.00534		.00166
2.615	0.83232	43.9	0.83697	43.0	0.00535	0.9	0.00165
.616	.83276		.83740		.00536		.00164
.617	.83320		.83783		.00537		.00163
.618	.83364		.83826		.00538		.00162
.619	.83407		.83869		.00539		.00161
2.620	0.83451	43.9	0.83912	43.0	0.00540	0.9	0.00160
.621	.83495		.83955		.00541		.00159
.622	.83539		.83998		.00541		.00159
.623	.83583		.84041		.00542		.00158
.624	.83627		.84084		.00543		.00157
2.625	0.83671	43.9	0.84127	43.0	0.00544	0.9	0.00156
.626	.83715		.84170		.00545		.00155
.627	.83759		.84213		.00546		.00154
.628	.83802		.84256		.00547		.00153
.629	.83846		.84300		.00548		.00152
2.630	0.83890	43.9	0.84343	43.0	0.00549	0.9	0.00151
.631	.83934		.84386		.00550		.00150
.632	.83978		.84429		.00551		.00149
.633	.84022		.84472		.00551		.00149
.634	.84066		.84515		.00552		.00148
2.635	0.84110	43.9	0.84558	43.0	0.00553	0.9	0.00147
.636	.84154		.84599		.00554		.00146
.637	.84197		.84642		.00555		.00145
.638	.84241		.84685		.00556		.00144
.639	.84285		.84728		.00557		.00143
2.640	0.84329	43.9	0.84771	43.0	0.00558	0.9	0.00143
.641	.84373		.84814		.00559		.00141
.642	.84417		.84857		.00560		.00141
.643	.84461		.84900		.00560		.00140
.644	.84505		.84943		.00561		.00139
2.645	0.84548	43.9	0.84986	43.0	0.00562	0.9	0.00138
.646	.84592		.85029		.00563		.00137
.647	.84636		.85072		.00564		.00136
.648	.84680		.85115		.00565		.00135
.649	.84724		.85158		.00566		.00134
2.650	0.84768	43.9	0.85201	43.0	0.00566	0.9	0.00134
0	$\log \tanh u$	$\infty F_0'$	$\log \sec u$	$\infty F_0'$	$\log \sin u$	$\infty F_0'$	$\log \csc u$

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.650	0.84768	43,9	0.85201	43,0	9.99566	0,9	0.00434
.651	.84812		.85244		.99567		.00433
.652	.84855		.85287		.99568		.00432
.653	.84899		.85330		.99569		.00431
.654	.84943		.85373		.99570		.00430
2.655	0.84987	43,9	0.85416	43,0	9.99571	0,9	0.00429
.656	.85031		.85459		.99572		.00428
.657	.85075		.85502		.99573		.00428
.658	.85119		.85545		.99574		.00427
.659	.85162		.85588				.00426
2.660	0.85206	43,9	0.85631	43,0	9.99575	0,8	0.00425
.661	.85250		.85674		.99576		.00424
.662	.85294		.85717		.99577		.00423
.663	.85338		.85760		.99578		.00422
.664	.85382		.85803		.99578		.00422
2.665	0.85426	43,9	0.85846	43,0	9.99579	0,8	0.00421
.666	.85469		.85889		.99580		.00420
.667	.85513		.85932		.99581		.00419
.668	.85557	43,8	.85975		.99582		.00418
.669	.85601		.86018		.99583		.00417
2.670	0.85645	43,8	0.86061	43,0	9.99583	0,8	0.00417
.671	.85689		.86104		.99584		.00416
.672	.85733		.86147		.99585		.00415
.673	.85776		.86190		.99585		.00414
.674	.85820		.86233		.99587		.00413
2.675	0.85864	43,8	0.86276	43,0	9.99588	0,8	0.00412
.676	.85908		.86320		.99588		.00412
.677	.85952		.86363		.99589		.00411
.678	.85996		.86406		.99590		.00410
.679	.86039		.86449		.99591		.00409
2.680	0.86083	43,8	0.86492	43,0	9.99592	0,8	0.00408
.681	.86127		.86535		.99592		.00408
.682	.86171		.86578		.99593		.00407
.683	.86215		.86621		.99594		.00406
.684	.86259		.86664		.99595		.00405
2.685	0.86302	43,8	0.86707	43,0	9.99596	0,8	0.00404
.686	.86346		.86750		.99597		.00403
.687	.86390		.86793		.99597		.00403
.688	.86434		.86836		.99598		.00402
.689	.86478		.86879		.99599		.00401
2.690	0.86522	43,8	0.86922	43,0	9.99600	0,8	0.00400
.691	.86565		.86965		.99601		.00399
.692	.86609		.87008		.99601		.00399
.693	.86653		.87051		.99602		.00398
.694	.86697		.87094		.99603		.00397
2.695	0.86741	43,8	0.87137	43,0	9.99604	0,8	0.00396
.696	.86785		.87180		.99605		.00395
.697	.86828		.87223		.99605		.00395
.698	.86872		.87266		.99606		.00394
.699	.86916		.87309		.99607		.00393
2.700	0.86960	43,8	0.87352	43,0	9.99608	0,8	0.00392
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cose gd u

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_2'$	log cosh u	$\omega F_2'$	log tanh u	$\omega F_2'$	log coth u
2.700	0.86960	43.8	0.87352	43.0	0.00008	0.3	0.00000
.701	.87001		.87395		.00008		.00002
.702	.87048		.87438		.00008		.00004
.703	.87091		.87481		.00010		.00006
.704	.87135		.87524		.00011		.00008
2.705	0.87179	43.8	0.87567	43.0	0.00012	0.3	0.00000
.706	.87223		.87610		.00012		.00008
.707	.87267		.87654		.00013		.00010
.708	.87310		.87697		.00014		.00012
.709	.87354		.87740		.00015		.00015
2.710	0.87398	43.8	0.87783	43.0	0.00015	0.3	0.00000
.711	.87442		.87826		.00016		.00010
.712	.87486		.87869		.00017		.00012
.713	.87530		.87912		.00018		.00015
.714	.87573		.87955		.00019		.00018
2.715	0.87617	43.8	0.87998	43.1	0.00019	0.3	0.00000
.716	.87661		.88041		.00020		.00010
.717	.87705		.88084		.00021		.00012
.718	.87749		.88127		.00022		.00015
.719	.87792		.88170		.00023		.00018
2.720	0.87836	43.8	0.88213	43.1	0.00023	0.3	0.00000
.721	.87880		.88256		.00024		.00010
.722	.87924		.88299		.00025		.00012
.723	.87968		.88342		.00025		.00015
.724	.88011		.88385		.00026	0.7	.00018
2.725	0.88055	43.8	0.88428	43.0	0.00027	0.7	0.00000
.726	.88099		.88471		.00028		.00010
.727	.88143		.88515		.00028		.00012
.728	.88187		.88558		.00029		.00015
.729	.88230		.88601		.00030		.00018
2.730	0.88274	43.8	0.88644	43.1	0.00031	0.7	0.00000
.731	.88318		.88687		.00031		.00010
.732	.88362		.88730		.00032		.00012
.733	.88406		.88773		.00033		.00015
.734	.88449		.88816		.00033		.00018
2.735	0.88493	43.8	0.88859	43.1	0.00034	0.7	0.00000
.736	.88537		.88902		.00035		.00010
.737	.88581		.88945		.00036		.00012
.738	.88625		.88988		.00036		.00015
.739	.88668		.89031		.00037		.00018
2.740	0.88712	43.8	0.89074	43.1	0.00038	0.7	0.00000
.741	.88756		.89117		.00039		.00010
.742	.88800		.89161		.00039		.00012
.743	.88844		.89204		.00040		.00015
.744	.88887		.89247		.00041		.00018
2.745	0.88931	43.8	0.89290	43.1	0.00041	0.7	0.00000
.746	.88975		.89333		.00042		.00010
.747	.89019		.89376		.00043		.00012
.748	.89063		.89419		.00044		.00015
.749	.89106		.89462		.00044		.00018
2.750	0.89150	43.8	0.89505	43.1	0.00045	0.7	0.00000
u	log tanh u	$\omega F_2'$	log coth u	$\omega F_2'$	log tanh u	$\omega F_2'$	log coth u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.750	0.80150	43.8	0.80505	43.1	9.99545	0.7	0.00355
.751	.80164		.80518		.99546		.00354
.752	.80178		.80531		.99546		.00354
.753	.80191		.80544		.99547		.00353
.754	.80205		.80557		.99548		.00352
2.755	0.80200	43.8	0.80720	43.4	9.99649	0.7	0.00351
.756	.80213		.80764		.99649		.00351
.757	.80227		.80807		.99650		.00350
.758	.80240		.80850		.99651		.00349
.759	.80254		.80893		.99651		.00349
2.760	0.80588	43.8	0.80936	43.1	9.99652	0.7	0.00348
.761	.80632		.80979		.99653		.00347
.762	.80676		.90023		.99653		.00347
.763	.80710		.90065		.99654		.00346
.764	.80763		.90108		.99655		.00345
2.765	0.80807	43.8	0.90151	43.1	9.99656	0.7	0.00344
.766	.80851		.90194		.99656		.00344
.767	.80894		.90237		.99657		.00343
.768	.80938		.90281		.99658		.00343
.769	.80982		.90324		.99658		.00342
2.770	0.90026	43.8	0.90367	43.1	9.99659	0.7	0.00341
.771	.90069		.90410		.99660		.00340
.772	.90113		.90453		.99660		.00340
.773	.90157		.90496		.99661		.00339
.774	.90201		.90539		.99662		.00338
2.775	0.90245	43.8	0.90582	43.1	9.99662	0.7	0.00338
.776	.90288		.90625		.99663		.00337
.777	.90332		.90668		.99664		.00336
.778	.90376		.90712		.99664		.00336
.779	.90420		.90755		.99665		.00335
2.780	0.90463	43.8	0.90798	43.1	9.99666	0.7	0.00334
.781	.90507		.90841		.99666		.00334
.782	.90551		.90884		.99667		.00333
.783	.90595		.90927		.99668		.00332
.784	.90638		.90970		.99668		.00332
2.785	0.90682	43.8	0.91013	43.1	9.99669	0.7	0.00331
.786	.90726		.91056		.99670		.00330
.787	.90770		.91099		.99670		.00330
.788	.90813		.91143		.99671		.00329
.789	.90857		.91186		.99672		.00328
2.790	0.90901	43.8	0.91229	43.1	9.99672	0.7	0.00328
.791	.90945		.91272		.99673		.00327
.792	.90989		.91315		.99674		.00326
.793	.91032		.91358		.99674		.00326
.794	.91076		.91401		.99675		.00325
2.795	0.91120	43.8	0.91444	43.1	9.99676	0.6	0.00324
.796	.91164		.91487		.99676		.00324
.797	.91207		.91530		.99677		.00323
.798	.91251		.91574		.99678		.00322
.799	.91295		.91617		.99678		.00322
2.800	0.91339	43.8	0.91660	43.1	9.99679	0.6	0.00321
$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.800	0.91339	43.8	0.91630	43.1	9.99970	0.0	0.00030
.801	.91382		.91703		.99979		.00031
.802	.91426		.91746		.99980		.00032
.803	.91470	43.7	.91789		.99981		.00033
.804	.91514		.91832		.99982		.00034
2.805	0.91557	43.7	0.91875	43.1	9.99983	0.0	0.00035
.806	.91601		.91918		.99984		.00036
.807	.91645		.91962		.99985		.00037
.808	.91689		.92005		.99986		.00038
.809	.91732		.92048		.99987		.00039
2.810	0.91776	43.7	0.92091	43.1	9.99988	0.0	0.00040
.811	.91820		.92134		.99989		.00041
.812	.91864		.92177		.99990		.00042
.813	.91907		.92220		.99991		.00043
.814	.91951		.92263		.99992		.00044
2.815	0.91995	43.7	0.92306	43.1	9.99993	0.0	0.00045
.816	.92039		.92350		.99994		.00046
.817	.92082		.92393		.99995		.00047
.818	.92126		.92436		.99996		.00048
.819	.92170		.92479		.99997		.00049
2.820	0.92213	43.7	0.92522	43.1	9.99998	0.0	0.00050
.821	.92257		.92565		.99999		.00051
.822	.92301		.92608		.99999		.00052
.823	.92345		.92651		.99999		.00053
.824	.92388		.92695		.99999		.00054
2.825	0.92432	43.7	0.92738	43.1	9.99999	0.0	0.00055
.826	.92476		.92781		.99999		.00056
.827	.92520		.92824		.99999		.00057
.828	.92563		.92867		.99999		.00058
.829	.92607		.92910		.99999		.00059
2.830	0.92651	43.7	0.92953	43.1	9.99999	0.0	0.00060
.831	.92695		.92996		.99999		.00061
.832	.92738		.93039		.99999		.00062
.833	.92782		.93083		.99999		.00063
.834	.92826		.93126		.99999		.00064
2.835	0.92869	43.7	0.93169	43.1	9.99999	0.0	0.00065
.836	.92913		.93212		.99999		.00066
.837	.92957		.93255		.99999		.00067
.838	.93001		.93298		.99999		.00068
.839	.93044		.93341		.99999		.00069
2.840	0.93088	43.7	0.93385	43.1	9.99999	0.0	0.00070
.841	.93132		.93428		.99999		.00071
.842	.93176		.93471		.99999		.00072
.843	.93219		.93514		.99999		.00073
.844	.93263		.93557		.99999		.00074
2.845	0.93307	43.7	0.93600	43.1	9.99999	0.0	0.00075
.846	.93350		.93643		.99999		.00076
.847	.93394		.93687		.99999		.00077
.848	.93438		.93730		.99999		.00078
.849	.93482		.93773		.99999		.00079
2.850	0.93525	43.7	0.93816	43.1	9.99999	0.0	0.00080
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
2.850	0.93525	43.7	0.93810	43.1	9.99700	0.6	0.00291
.851	.93530		.93859		.99710		.00290
.852	.93543		.93902		.99711		.00289
.853	.93557		.93945		.99711		.00289
.854	.93570		.93989		.99712		.00288
2.855	0.93741	43.7	0.94032	43.1	9.99712	0.6	0.00288
.856	.93733		.94075		.99713		.00287
.857	.93741		.94118		.99713		.00287
.858	.93755		.94161		.99714		.00286
.859	.93769		.94204		.99715		.00285
2.860	0.93963	43.7	0.94247	43.1	9.99715	0.6	0.00285
.861	.93966		.94291		.99716		.00284
.862	.93980		.94334		.99716		.00284
.863	.93994		.94377		.99717		.00283
.864	.94007		.94420		.99717		.00283
2.865	0.94181	43.7	0.94463	43.1	9.99718	0.6	0.00282
.866	.94225		.94506		.99719		.00281
.867	.94259		.94549		.99719		.00281
.868	.94312		.94593		.99720		.00280
.869	.94356		.94636	43.2	.99720		.00280
2.870	0.94400	43.7	0.94679	43.2	9.99721	0.6	0.00279
.871	.94443		.94722		.99721		.00279
.872	.94487		.94765		.99722		.00278
.873	.94531		.94808		.99722		.00278
.874	.94575		.94852		.99723		.00277
2.875	0.94618	43.7	0.94895	43.2	9.99724	0.6	0.00276
.876	.94662		.94938		.99724		.00276
.877	.94706		.94981		.99725		.00275
.878	.94749		.95024		.99725	0.5	.00275
.879	.94793		.95067		.99726		.00274
2.880	0.94837	43.7	0.95110	43.2	9.99727	0.5	0.00274
.881	.94880		.95153		.99727		.00273
.882	.94924		.95197		.99727		.00273
.883	.94968		.95240		.99728		.00272
.884	.95012		.95283		.99728		.00272
2.885	0.95055	43.7	0.95326	43.2	9.99729	0.5	0.00271
.886	.95099		.95369		.99730		.00270
.887	.95143		.95413		.99730		.00270
.888	.95186		.95456		.99731		.00269
.889	.95230		.95499		.99731		.00269
2.890	0.95274	43.7	0.95542	43.2	9.99732	0.5	0.00268
.891	.95317		.95585		.99732		.00268
.892	.95361		.95628		.99733		.00267
.893	.95405		.95672		.99733		.00267
.894	.95449		.95715		.99734		.00266
2.895	0.95492	43.7	0.95758	43.2	9.99734	0.5	0.00266
.896	.95536		.95801		.99735		.00265
.897	.95580		.95844		.99735		.00265
.898	.95623		.95887		.99736		.00264
.899	.95667		.95931		.99737		.00263
2.900	0.95711	43.7	0.95974	43.2	9.99737	0.5	0.00263
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.900	0.95711	43.7	0.95974	43.2	9.99737	0.5	0.00263
.901	.95754		.96017		.99738		.00264
.902	.95798		.96060		.99739		.00265
.903	.95842		.96103		.99740		.00266
.904	.95885		.96146		.99741		.00267
2.905	0.95929	43.7	0.96190	43.2	9.99740	0.5	0.00266
.906	.95973		.96233		.99740		.00266
.907	.96017		.96276		.99741		.00267
.908	.96060		.96319		.99741		.00268
.909	.96104		.96362		.99742		.00269
2.910	0.96148	43.7	0.96405	43.2	9.99742	0.5	0.00268
.911	.96191		.96449		.99743		.00269
.912	.96235		.96492		.99743		.00270
.913	.96279		.96535		.99744		.00271
.914	.96322		.96578		.99744		.00272
2.915	0.96366	43.7	0.96621	43.2	9.99745	0.5	0.00271
.916	.96410		.96664		.99745		.00272
.917	.96453		.96708		.99746		.00273
.918	.96497		.96751		.99746		.00274
.919	.96541		.96794		.99747		.00275
2.920	0.96584	43.7	0.96837	43.2	9.99747	0.5	0.00274
.921	.96628		.96880		.99748		.00275
.922	.96672		.96923		.99748		.00276
.923	.96716		.96967		.99749		.00277
.924	.96759		.97010		.99749		.00278
2.925	0.96803	43.7	0.97053	43.2	9.99750	0.5	0.00277
.926	.96847		.97096		.99750		.00278
.927	.96890		.97139		.99751		.00279
.928	.96934		.97183		.99751		.00280
.929	.96978		.97226		.99752		.00281
2.930	0.97021	43.7	0.97269	43.2	9.99752	0.5	0.00280
.931	.97065		.97312		.99753		.00281
.932	.97109		.97355		.99753		.00282
.933	.97152		.97398		.99754		.00283
.934	.97196		.97442		.99754		.00284
2.935	0.97240	43.7	0.97485	43.2	9.99755	0.5	0.00283
.936	.97283		.97528		.99755		.00284
.937	.97327		.97571		.99756		.00285
.938	.97371		.97614		.99756		.00286
.939	.97414		.97658		.99757		.00287
2.940	0.97458	43.7	0.97701	43.2	9.99757	0.5	0.00286
.941	.97502		.97744		.99758		.00287
.942	.97545		.97787		.99758		.00288
.943	.97589		.97830		.99759		.00289
.944	.97633		.97874		.99759		.00290
2.945	0.97676	43.7	0.97917	43.2	9.99760	0.5	0.00289
.946	.97720		.97960		.99760		.00290
.947	.97764		.98003		.99761		.00291
.948	.97807		.98046		.99761		.00292
.949	.97851		.98089		.99762		.00293
2.950	0.97895	43.7	0.98133	43.2	9.99762	0.5	0.00292
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u

SMITHSONIAN TABLES

Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
2.950	0.97895	43,7	0.98133	43,2	9.99762	0,5	0.00238
.951	.97938		.98176		.99763		.00237
.952	.97982		.98219		.99763		.00237
.953	.98026		.98262		.99763		.00237
.954	.98069		.98305		.99764		.00236
2.955	0.98113	43,7	0.98349	43,2	9.99764	0,5	0.00236
.956	.98157		.98392		.99765		.00235
.957	.98200		.98435		.99765		.00235
.958	.98244		.98478		.99766		.00234
.959	.98288		.98521		.99766		.00234
2.960	0.98331	43,7	0.98565	43,2	9.99767	0,5	0.00233
.961	.98375		.98608		.99767		.00233
.962	.98419		.98651		.99768		.00232
.963	.98462		.98694		.99768		.00232
.964	.98506		.98737		.99769		.00231
2.965	0.98550	43,7	0.98781	43,2	9.99769	0,5	0.00231
.966	.98593		.98824		.99770		.00230
.967	.98637		.98867		.99770		.00230
.968	.98681		.98910		.99770		.00230
.969	.98724		.98953		.99771		.00229
2.970	0.98768	43,7	0.98997	43,2	9.99771	0,5	0.00229
.971	.98812		.99040		.99772		.00228
.972	.98855		.99083		.99772		.00228
.973	.98899		.99126		.99773		.00227
.974	.98943		.99169		.99773		.00227
2.975	0.98986	43,7	0.99213	43,2	9.99774	0,5	0.00226
.976	.99030		.99256		.99774		.00226
.977	.99074		.99299		.99775		.00225
.978	.99117		.99342		.99775	0,4	.00225
.979	.99161		.99385		.99775		.00225
2.980	0.99205	43,7	0.99429	43,2	9.99776	0,4	0.00224
.981	.99248		.99472		.99776		.00224
.982	.99292		.99515		.99777		.00223
.983	.99336		.99558		.99777		.00223
.984	.99379		.99601		.99778		.00222
2.985	0.99423	43,7	0.99645	43,2	9.99778	0,4	0.00222
.986	.99466		.99688		.99779		.00221
.987	.99510		.99731		.99779		.00221
.988	.99554		.99774		.99779		.00221
.989	.99597		.99818		.99780		.00220
2.990	0.99641	43,6	0.99861	43,2	9.99780	0,4	0.00220
.991	.99685		.99904		.99781		.00219
.992	.99728		.99947		.99781		.00219
.993	.99772		.99990		.99782		.00218
.994	.99816		1.00034		.99782		.00218
2.995	0.99859	43,6	1.00077	43,2	9.99783	0,4	0.00217
.996	.99903		.00120		.99783		.00217
.997	.99947		.00163		.99783		.00217
.998	.99990		.00206		.99784		.00216
.999	1.00034		.00250		.99784		.00216
3.000	1.00078	43,6	1.00293	43,2	9.99785	0,4	0.00215
u	log tan gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log cose gd u



# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
3.00	1.00078	436.5	1.00203	432.1	9.99785	4.3	0.00115
.01	.00514	436.4	.00725	432.2	.99789	4.2	.00111
.02	.00950	436.4	.01157	432.2	.99793	4.1	.00107
.03	.01387	436.3	.01589	432.3	.99797	4.1	.00103
.04	.01823	436.3	.02022	432.3	.99801	4.0	.00100
3.05	1.02259	436.2	1.02454	432.4	9.99805	3.9	0.00105
.05	.02699	436.2	.02885	432.4	.99809	3.8	.00101
.07	.03132	436.2	.03319	432.4	.99813	3.7	.00137
.08	.03568	436.1	.03751	432.5	.99817	3.7	.00133
.09	.04004	436.1	.04181	432.5	.99820	3.6	.00130
3.10	1.04440	436.1	1.04616	432.5	9.99824	3.5	0.00170
.11	.04876	436.0	.05049	432.6	.99827	3.4	.00173
.12	.05312	436.0	.05481	432.6	.99831	3.4	.00169
.13	.05748	436.0	.05914	432.6	.99834	3.3	.00166
.14	.06184	435.9	.06347	432.7	.99837	3.3	.00163
3.15	1.06620	435.9	1.06779	432.7	9.99841	3.2	0.00159
.16	.07056	435.9	.07212	432.7	.99844	3.1	.00150
.17	.07492	435.8	.07645	432.8	.99847	3.1	.00133
.18	.07927	435.8	.08078	432.8	.99850	3.0	.00150
.19	.08363	435.8	.08510	432.8	.99853	2.9	.00147
3.20	1.08799	435.7	1.08943	432.9	9.99856	2.9	0.00144
.21	.09235	435.7	.09376	432.9	.99859	2.8	.00141
.22	.09670	435.7	.09809	432.9	.99861	2.8	.00130
.23	.10105	435.7	.10242	432.9	.99864	2.7	.00146
.24	.10542	435.6	.10675	433.0	.99867	2.7	.00143
3.25	1.10977	435.6	1.11168	433.0	9.99870	2.6	0.00131
.25	.11413	435.6	.11541	433.0	.99872	2.6	.00128
.27	.11849	435.6	.11974	433.0	.99875	2.5	.00145
.28	.12284	435.5	.12407	433.1	.99877	2.5	.00123
.29	.12720	435.5	.12840	433.1	.99879	2.4	.00121
3.30	1.13155	435.5	1.13273	433.1	9.99882	2.4	0.00118
.31	.13591	435.5	.13705	433.1	.99884	2.3	.00116
.32	.14026	435.4	.14139	433.2	.99886	2.3	.00114
.33	.14461	435.4	.14573	433.2	.99889	2.2	.00111
.34	.14897	435.4	.15005	433.2	.99891	2.2	.00109
3.35	1.15332	435.4	1.15439	433.2	9.99893	2.1	0.00107
.36	.15768	435.3	.15872	433.2	.99895	2.1	.00105
.37	.16203	435.3	.16305	433.3	.99897	2.1	.00103
.38	.16638	435.3	.16739	433.3	.99899	2.0	.00101
.39	.17073	435.3	.17172	433.3	.99901	2.0	.00099
3.40	1.17509	435.3	1.17605	433.3	9.99903	1.9	0.00097
.41	.17944	435.2	.18039	433.3	.99905	1.9	.00095
.42	.18379	435.2	.18472	433.4	.99907	1.9	.00093
.43	.18814	435.2	.18905	433.4	.99909	1.8	.00091
.44	.19250	435.2	.19339	433.4	.99911	1.8	.00089
3.45	1.19685	435.2	1.19772	433.4	9.99912	1.8	0.00088
.46	.20120	435.2	.20205	433.4	.99914	1.7	.00086
.47	.20555	435.1	.20639	433.5	.99916	1.7	.00084
.48	.20990	435.1	.21073	433.5	.99918	1.6	.00082
.49	.21425	435.1	.21505	433.5	.99919	1.6	.00081
3.50	1.21860	435.1	1.21940	433.5	9.99921	1.6	0.00079
u	log inn gd u	$\omega F_0'$	log sec gd u	$\omega F_0'$	log sin gd u	$\omega F_0'$	log csc gd u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$\log \tanh u$	$\infty F_0'$	$\log \coth u$
3.30	1.31850	435.1	1.21040	433.5	9.99921	1.6	0.00079
.51	1.32295		1.21373		.99922		.00078
.52	1.32731		1.21807		.99921	1.5	.00076
.53	1.33166	435.0	1.22340	433.6	.99925		.00075
.54	1.33601		1.22874		.99927		.00073
3.55	1.34036	435.0	1.23407	433.6	9.99928	1.1	0.00072
.56	1.34471		1.23941		.99930		.00070
.57	1.34906		1.24475		.99931		.00069
.58	1.35341		1.25008		.99933	1.3	.00067
.59	1.35776		1.25542		.99934		.00066
3.60	1.36211	434.9	1.26075	433.6	9.99935	1.3	0.00065
.61	1.36646		1.26609	433.7	.99936		.00064
.62	1.37080		1.27143		.99938	1.2	.00062
.63	1.37515		1.27676		.99939		.00061
.64	1.37950		1.28210		.99940		.00060
3.65	1.38385	434.9	1.28744	433.7	9.99941	1.2	0.00059
.66	1.38820		1.29278		.99942		.00058
.67	1.39255		1.29811		.99944	1.1	.00056
.68	1.39690	434.8	1.30345	433.8	.99945		.00055
.69	1.40125		1.30879		.99946		.00054
3.70	1.40559	434.8	1.31412	433.8	9.99947	1.1	0.00053
.71	1.40994		1.31946		.99948	1.0	.00052
.72	1.41429		1.32480		.99949		.00051
.73	1.41864		1.33014		.99950		.00050
.74	1.42299		1.33548		.99951		.00049
3.75	1.42733	434.8	1.34081	433.8	9.99952	1.0	0.00048
.76	1.43168		1.34615		.99953	0.9	.00047
.77	1.43603		1.35149		.99954		.00046
.78	1.44038	434.7	1.35683	433.9	.99955		.00045
.79	1.44472		1.36217		.99956		.00044
3.80	1.44907	434.7	1.36751	433.9	9.99957	0.9	0.00043
.81	1.45342		1.37284		.99957		.00043
.82	1.45777		1.37818		.99958	0.8	.00042
.83	1.46211		1.38352		.99959		.00041
.84	1.46646		1.38886		.99960		.00040
3.85	1.47081	434.7	1.39419	433.9	9.99961	0.8	0.00039
.86	1.47515		1.39953		.99961		.00039
.87	1.47950		1.40487		.99962		.00038
.88	1.48385		1.41021		.99963	0.7	.00037
.89	1.48819		1.41555		.99964		.00036
3.90	1.49254	434.7	1.42089	433.9	9.99964	0.7	0.00036
.91	1.49689	434.6	1.42623	434.0	.99965		.00035
.92	1.50123		1.43157		.99966		.00034
.93	1.50558		1.43691		.99966		.00034
.94	1.50993		1.44225		.99967		.00033
3.95	1.51427	434.6	1.44759	434.0	9.99968	0.6	0.00032
.96	1.51862		1.45293		.99968		.00032
.97	1.52296		1.45827		.99969		.00031
.98	1.52731		1.46361		.99970		.00030
.99	1.53166		1.46895		.99970		.00030
4.00	1.53600	434.6	1.47429	434.0	9.99971	0.6	0.00029
$u$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$\log \tanh u$	$\infty F_0'$	$\log \coth u$

# Logarithms of Hyperbolic Functions.

u	log snh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
4.00	1.43600	434.6	1.43629	434.0	9.99971	0.0	0.00029
.01	.44035		.44063		.99971		.00029
.02	.44469		.44497		.99972		.00028
.03	.44904		.44931		.99973	0.5	.00027
.04	.45339		.45365		.99973		.00027
4.05	1.45773	434.6	1.45799	434.0	9.99974	0.5	0.00026
.06	.46208		.46233		.99974		.00026
.07	.46642	434.5	.46668		.99975		.00025
.08	.47077		.47102		.99975		.00025
.09	.47511		.47536	434.1	.99976		.00024
4.10	1.47946	434.5	1.47970	434.1	9.99976	0.5	0.00024
.11	.48380		.48404		.99977		.00023
.12	.48815		.48838		.99977		.00023
.13	.49249		.49272		.99978	0.4	.00022
.14	.49684		.49706		.99978		.00022
4.15	1.50118	434.5	1.50140	434.1	9.99978	0.4	0.00022
.16	.50553		.50574		.99979		.00021
.17	.50987		.51008		.99979		.00021
.18	.51422		.51442		.99980		.00020
.19	.51856		.51876		.99980		.00020
4.20	1.52291	434.5	1.52310	434.1	9.99980	0.4	0.00020
.21	.52725		.52745		.99981		.00019
.22	.53160		.53179		.99981		.00019
.23	.53594		.53613		.99982		.00018
.24	.54029		.54047		.99982		.00018
4.25	1.54463	434.5	1.54481	434.1	9.99982	0.4	0.00018
.26	.54898		.54915		.99983	0.3	.00017
.27	.55332		.55349		.99983		.00017
.28	.55767		.55783		.99983		.00017
.29	.56201		.56217		.99984		.00016
4.30	1.56636	434.5	1.56652	434.1	9.99984	0.3	0.00016
.31	.57070		.57086		.99984		.00016
.32	.57505	434.4	.57520		.99985		.00015
.33	.57939		.57954		.99985		.00015
.34	.58373		.58388		.99985		.00015
4.35	1.58808	434.4	1.58822	434.1	9.99986	0.3	0.00014
.36	.59242		.59256		.99986		.00014
.37	.59677		.59691	434.2	.99986		.00014
.38	.60111		.60125		.99986		.00014
.39	.60546		.60559		.99987		.00013
4.40	1.60980	434.4	1.60993	434.2	9.99987	0.3	0.00013
.41	.61414		.61427		.99987		.00013
.42	.61849		.61861		.99987		.00013
.43	.62283		.62295		.99988	0.2	.00012
.44	.62718		.62730		.99988		.00012
4.45	1.63152	434.4	1.63164	434.2	9.99988	0.2	0.00012
.46	.63587		.63598		.99988		.00012
.47	.64021		.64032		.99989		.00011
.48	.64455		.64467		.99989		.00011
.49	.64890		.64901		.99989		.00011
4.50	1.65324	434.4	1.65335	434.2	9.99989	0.2	0.00011
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log snh u	$\omega F_0'$	log cosh u

SMITHSONIAN TABLES

# Logarithms of Hyperbolic Functions.

u	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	log tanh u	$\omega F_0'$	log coth u
4.50	1.65333	434.4	1.65335	434.2	9.99989	0.2	0.00011
.51	.65259		.65269		.99989		.00011
.52	.65193		.65203		.99990		.00010
.53	.65127		.65137		.99990		.00010
.54	.65062		.65072		.99990		.00010
4.55	1.64996	434.4	1.64996	434.2	9.99990	0.2	0.00010
.56	.64931		.64940		.99990		.00010
.57	.64865		.64874		.99991		.00009
.58	.64800		.64808		.99991		.00009
.59	.64734		.64743		.99991		.00009
4.60	1.64668	434.4	1.64667	434.2	9.99991	0.2	0.00009
.61	.64603		.64611		.99991		.00009
.62	.64537		.64545		.99992		.00008
.63	.64471		.64479		.99992		.00008
.64	.64406		.64414		.99992		.00008
4.65	1.71840	434.4	1.71848	434.2	9.99992	0.2	0.00008
.66	.72274		.72282		.99992		.00008
.67	.72209		.72216		.99992		.00008
.68	.72143		.72151		.99993	0.1	.00007
.69	.72077		.72085		.99993		.00007
4.70	1.74013	434.4	1.74019	434.2	9.99993	0.1	0.00007
.71	.74446		.74453		.99993		.00007
.72	.74381		.74387		.99993		.00007
.73	.74315		.74322		.99993		.00007
.74	.74249		.74256		.99993		.00007
4.75	1.76181	434.4	1.76190	434.2	9.99993	0.1	0.00007
.76	.76618		.76624		.99994		.00006
.77	.76552		.76559		.99994		.00006
.78	.76487		.76493		.99994		.00006
.79	.76421		.76427		.99994		.00006
4.80	1.78355	434.4	1.78361	434.2	9.99994	0.1	0.00006
.81	.78790		.78796		.99994		.00006
.82	.78724		.78730		.99994		.00006
.83	.78658	434.3	.78664		.99994		.00006
.84	.78593		.78598		.99995		.00005
4.85	1.80527	434.3	1.80532	434.2	9.99995	0.1	0.00005
.86	.80962		.80967		.99995		.00005
.87	.80896		.80901		.99995		.00005
.88	.80830		.80835		.99995		.00005
.89	.80765		.80769		.99995		.00005
4.90	1.82600	434.3	1.82604	434.2	9.99995	0.1	0.00005
.91	.83133		.83138		.99995		.00005
.92	.83068		.83072		.99995		.00005
.93	.83003		.83006		.99995		.00005
.94	.82936		.82941	434.3	.99996		.00004
4.95	1.84871	434.3	1.84875	434.3	9.99996	0.1	0.00004
.96	.85305		.85309		.99996		.00004
.97	.85239		.85243		.99996		.00004
.98	.85174		.85178		.99996		.00004
.99	.85108		.85112		.99996		.00004
5.00	1.87042	434.3	1.87046	434.3	9.99996	0.1	0.00004
u	log tanh u	$\omega F_0'$	log coth u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
5.00	1.87042	434.3	1.87046	434.3	9.99995	0.1	0.00004
.01	.87477		.87480		.99990		.00004
.02	.87911		.87915		.99993		.00004
.03	.88345		.88349		.99996		.00004
.04	.88780		.88783		.99999		.00004
5.05	1.89214	434.3	1.89217	434.3	9.99996	0.1	0.00004
.06	.89648		.89652		.99997		.00003
.07	.90083		.90086		.99997		.00003
.08	.90517		.90520		.99997		.00003
.09	.90951		.90955		.99997		.00003
5.10	1.91386	434.3	1.91389	434.3	9.99997	0.1	0.00003
.11	.91820		.91823		.99997		.00003
.12	.92254		.92257		.99997		.00003
.13	.92689		.92692		.99997		.00003
.14	.93123		.93126		.99997		.00003
5.15	1.93557	434.3	1.93560	434.3	9.99997	0.1	0.00003
.16	.93992		.93994		.99997		.00003
.17	.94426		.94429		.99997		.00003
.18	.94860		.94863		.99997		.00003
.19	.95294		.95297		.99997		.00003
5.20	1.95729	434.3	1.95731	434.3	9.99997	0.1	0.00003
.21	.96163		.96166		.99997		.00003
.22	.96597		.96600		.99997		.00003
.23	.97032		.97034		.99998	0.0	.00002
.24	.97466		.97469		.99998		.00002
5.25	1.97900	434.3	1.97903	434.3	9.99998	0.0	0.00002
.26	.98335		.98337		.99998		.00002
.27	.98769		.98771		.99998		.00002
.28	.99203		.99205		.99998		.00002
.29	.99638		.99640		.99998		.00002
5.30	2.00072	434.3	2.00074	434.3	9.99998	0.0	0.00002
.31	.00506		.00508		.99998		.00002
.32	.00941		.00943		.99998		.00002
.33	.01375		.01377		.99998		.00002
.34	.01809		.01811		.99998		.00002
5.35	2.02244	434.3	2.02246	434.3	9.99998	0.0	0.00002
.36	.02678		.02680		.99998		.00002
.37	.03112		.03114		.99998		.00002
.38	.03547		.03548		.99998		.00002
.39	.03981		.03983		.99998		.00002
5.40	2.04415	434.3	2.04417	434.3	9.99998	0.0	0.00002
.41	.04849		.04851		.99998		.00002
.42	.05284		.05285		.99998		.00002
.43	.05718		.05720		.99998		.00002
.44	.06152		.06154		.99998		.00002
5.45	2.06587	434.3	2.06589	434.3	9.99998	0.0	0.00002
.46	.07021		.07023		.99998		.00002
.47	.07455		.07457		.99998		.00002
.48	.07890		.07891		.99998		.00002
.49	.08324		.08325		.99999		.00001
5.50	2.08758	434.3	2.08760	434.3	9.99999	0.0	0.00001
$u$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$

# Logarithms of Hyperbolic Functions.

$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$
5.50	2.08733	-434.3	2.08760	-434.3	9.99970	0.0	0.00001
.51	.09193		.09194		.99999		.00001
.52	.09527		.09528		.99999		.00001
.53	.10004		.10004		.99999		.00001
.54	.10495		.10497		.99999		.00001
5.55	2.10930	-434.3	2.10931	-434.3	9.99999	0.0	0.00001
.56	.11394		.11395		.99999		.00001
.57	.11793		.11800		.99999		.00001
.58	.12243		.12244		.99999		.00001
.59	.12662		.12663		.99999		.00001
5.60	2.13101	-434.3	2.13103	-434.3	9.99999	0.0	0.00001
.61	.13549		.13537		.99999		.00001
.62	.13970		.13971		.99999		.00001
.63	.14404		.14405		.99999		.00001
.64	.14839		.14840		.99999		.00001
5.65	2.15473	-434.3	2.15474	-434.3	9.99999	0.0	0.00001
.66	.15702		.15703		.99999		.00001
.67	.16141		.16142		.99999		.00001
.68	.16576		.16577		.99999		.00001
.69	.17010		.17011		.99999		.00001
5.70	2.17444	-434.3	2.17445	-434.3	9.99999	0.0	0.00001
.71	.17879		.17880		.99999		.00001
.72	.18314		.18314		.99999		.00001
.73	.18747		.18748		.99999		.00001
.74	.19182		.19182		.99999		.00001
5.75	2.19616	-434.3	2.19617	-434.3	9.99999	0.0	0.00001
.76	.20050		.20051		.99999		.00001
.77	.20484		.20485		.99999		.00001
.78	.20919		.20920		.99999		.00001
.79	.21354		.21354		.99999		.00001
5.80	2.21787	-434.3	2.21788	-434.3	9.99999	0.0	0.00001
.81	.22222		.22222		.99999		.00001
.82	.22656		.22657		.99999		.00001
.83	.23090		.23091		.99999		.00001
.84	.23525		.23525		.99999		.00001
5.85	2.23959	-434.3	2.23960	-434.3	9.99999	0.0	0.00001
.86	.24393		.24394		.99999		.00001
.87	.24828		.24828		.99999		.00001
.88	.25262		.25262		.99999		.00001
.89	.25696		.25697		.99999		.00001
5.90	2.26130	-434.3	2.26131	-434.3	9.99999	0.0	0.00001
.91	.26565		.26565		.99999		.00001
.92	.26999		.26999		.99999		.00001
.93	.27433		.27433		.99999		.00001
.94	.27868		.27868		.99999		.00001
5.95	2.28302	-434.3	2.28303	-434.3	9.99999	0.0	0.00001
.96	.28736		.28737		.99999		.00001
.97	.29171		.29171		.99999		.00001
.98	.29605		.29605		.99999		.00001
.99	.30039		.30040		.99999		.00001
6.00	2.30473	-434.3	2.30474	-434.3	9.99999	0.0	0.00001
$u$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$\log \tanh u$	$\omega F_0'$	$\log \coth u$



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TABLE II

NATURAL HYPERBOLIC FUNCTIONS

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# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_1'$	$\cosh u$	$\omega F_2'$	$\tanh u$	$\omega F_3'$	$\coth u$	$\omega F_4'$
0.0000	0.00000	10,0	1.00000	0,0	0.00000	10,0	∞	∞
.0001	.00010		.00000		.00010		10000,00	1000000,0
.0002	.00020		.00000		.00020		5000,00	250000,0
.0003	.00030		.00000		.00030		3333,33	111111,1
.0004	.00040		.00000		.00040		2500,00	62500,0
0.0005	0.00050	10,0	1.00000	0,0	0.00050	10,0	2000,00	40000,0
.0006	.00060		.00000		.00060		1666,67	27777,8
.0007	.00070		.00000		.00070		1428,57	20408,1
.0008	.00080		.00000		.00080		1250,00	15625,0
.0009	.00090		.00000		.00090		1111,11	12345,7
0.0010	0.00100	10,0	1.00000	0,0	0.00100	10,0	1000,00	10000,0
.0011	.00110		.00000		.00110		909,09	8201,5
.0012	.00120		.00000		.00120		833,33	6914,4
.0013	.00130		.00000		.00130		769,23	5917,2
.0014	.00140		.00000		.00140		714,29	5102,0
0.0015	0.00150	10,0	1.00000	0,0	0.00150	10,0	666,67	4144,4
.0016	.00160		.00000		.00160		625,00	3900,3
.0017	.00170		.00000		.00170		588,24	3480,4
.0018	.00180		.00000		.00180		555,56	3086,1
.0019	.00190		.00000		.00190		526,32	2770,1
0.0020	0.00200	10,0	1.00000	0,0	0.00200	10,0	500,00	2500,0
.0021	.00210		.00000		.00210		476,19	2379,6
.0022	.00220		.00000		.00220		454,55	2099,1
.0023	.00230		.00000		.00230		434,78	1860,4
.0024	.00240		.00000		.00240		416,67	1736,4
0.0025	0.00250	10,0	1.00000	0,0	0.00250	10,0	400,00	1600,0
.0026	.00260		.00000		.00260		384,62	1470,3
.0027	.00270		.00000		.00270		370,37	1371,7
.0028	.00280		.00000		.00280		357,14	1295,8
.0029	.00290		.00000		.00290		344,83	1189,1
0.0030	0.00300	10,0	1.00000	0,0	0.00300	10,0	333,33	1111,1
.0031	.00310		.00000		.00310		322,58	1040,6
.0032	.00320		.00001		.00320		312,50	970,6
.0033	.00330		.00001		.00330		303,03	918,3
.0034	.00340		.00001		.00340		294,12	865,1
0.0035	0.00350	10,0	1.00001	0,0	0.00350	10,0	285,71	810,3
.0036	.00360		.00001		.00360		277,28	774,6
.0037	.00370		.00001		.00370		270,27	730,5
.0038	.00380		.00001		.00380		263,16	693,5
.0039	.00390		.00001		.00390		256,41	657,5
0.0040	0.00400	10,0	1.00001	0,0	0.00400	10,0	250,00	625,0
.0041	.00410		.00001		.00410		243,90	591,0
.0042	.00420		.00001		.00420		238,10	560,0
.0043	.00430		.00001		.00430		232,56	530,8
.0044	.00440		.00001		.00440		227,27	510,5
0.0045	0.00450	10,0	1.00001	0,0	0.00450	10,0	222,22	493,8
.0046	.00460		.00001		.00460		217,39	472,0
.0047	.00470		.00001		.00470		212,77	452,7
.0048	.00480		.00001		.00480		208,33	434,0
.0049	.00490		.00001		.00490		204,08	416,5
0.0050	0.00500	10,0	1.00001	0,1	0.00500	10,0	200,00	400,0
$u$	$\tanh u$	$\omega F_5'$	$\operatorname{sech} u$	$\omega F_6'$	$\sinh u$	$\omega F_7'$	$\cosh u$	$\omega F_8'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
0.0050	0.005000	10.0	1.000001	0.1	0.005000	10.0	200.00	400.0
.0051	.005100		.000001		.005100		190.08	384.5
.0052	.005200		.000001		.005200		182.31	369.8
.0053	.005300		.000001		.005300		184.68	350.0
.0054	.005400		.000001		.005400		185.19	344.9
0.0055	0.005500	10.0	1.000002	0.1	0.005500	10.0	181.82	330.6
.0056	.005600		.000002		.005600		178.57	318.0
.0057	.005700		.000002		.005700		175.44	307.8
.0058	.005800		.000002		.005800		172.42	297.3
.0059	.005900		.000002		.005900		169.49	287.3
0.0060	0.006000	10.0	1.000002	0.1	0.006000	10.0	166.67	277.8
.0061	.006100		.000002		.006100		163.91	268.7
.0062	.006200		.000002		.006200		161.20	260.1
.0063	.006300		.000002		.006300		158.73	251.9
.0064	.006400		.000002		.006400		156.40	244.1
0.0065	0.006500	10.0	1.000002	0.1	0.006500	10.0	153.85	236.7
.0066	.006600		.000002		.006600		151.52	229.6
.0067	.006700		.000002		.006700		149.26	222.8
.0068	.006800		.000002		.006800		147.06	216.3
.0069	.006900		.000002		.006900		144.93	210.0
0.0070	0.007000	10.0	1.000002	0.1	0.007000	10.0	142.85	204.1
.0071	.007100		.000003		.007100		140.85	198.4
.0072	.007200		.000003		.007200		138.89	192.9
.0073	.007300		.000003		.007300		136.99	187.6
.0074	.007400		.000003		.007400		135.14	182.6
0.0075	0.007500	10.0	1.000003	0.1	0.007500	10.0	133.34	177.8
.0076	.007600		.000003		.007600		131.58	173.1
.0077	.007700		.000003		.007700		129.87	168.7
.0078	.007800		.000003		.007800		128.21	164.4
.0079	.007900		.000003		.007900		126.58	160.2
0.0080	0.008000	10.0	1.000003	0.1	0.008000	10.0	125.00	156.2
.0081	.008100		.000003		.008100		123.46	152.4
.0082	.008200		.000003		.008200		121.95	148.7
.0083	.008300		.000003		.008300		120.48	145.2
.0084	.008400		.000004		.008400		119.05	141.7
0.0085	0.008500	10.0	1.000004	0.1	0.008500	10.0	117.65	138.4
.0086	.008600		.000004		.008600		116.28	135.2
.0087	.008700		.000004		.008700		114.95	132.1
.0088	.008800		.000004		.008800		113.64	129.1
.0089	.008900		.000004		.008900		112.36	126.2
0.0090	0.009000	10.0	1.000004	0.1	0.009000	10.0	111.11	123.5
.0091	.009100		.000004		.009100		109.89	120.8
.0092	.009200		.000004		.009200		108.70	118.1
.0093	.009300		.000004		.009300		107.53	115.6
.0094	.009400		.000004		.009400		106.39	113.2
0.0095	0.009500	10.0	1.000005	0.1	0.009500	10.0	105.27	110.8
.0096	.009600		.000005		.009600		104.17	108.5
.0097	.009700		.000005		.009700		103.10	106.3
.0098	.009800		.000005		.009800		102.04	104.1
.0099	.009900		.000005		.009900		101.01	102.0
0.0100	0.010000	10.0	1.000005	0.1	0.010000	10.0	100.00	100.0
$u$	$\ln \operatorname{gd} u$	$\omega F_0'$	$\sec \operatorname{gd} u$	$\omega F_0'$	$\sin \operatorname{gd} u$	$\omega F_0'$	$\csc \operatorname{gd} u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0100	0.01000	10,0	1.00005	0,1	0.01000	10,0	100,003	1000,0
.0101	.01010		.00005		.01010		99,013	990,3
.0102	.01020		.00005		.01020		98,013	980,1
.0103	.01030		.00005		.01030		97,001	974,0
.0104	.01040		.00005		.01040		95,157	954,5
0.0105	0.01050	10,0	1.00006	0,1	0.01050	10,0	95,542	957,0
.0106	.01060		.00006		.01060		94,313	940,0
.0107	.01070		.00006		.01070		93,403	933,4
.0108	.01080		.00006		.01080		92,509	925,3
.0109	.01090		.00006		.01090		91,747	916,0
0.0110	0.01100	10,0	1.00006	0,1	0.01100	10,0	90,913	906,4
.0111	.01110		.00006		.01110		90,001	901,6
.0112	.01120		.00006		.01120		89,330	897,4
.0113	.01130		.00006		.01130		88,490	886,1
.0114	.01140		.00006		.01140		87,743	879,1
0.0115	0.01150	10,0	1.00007	0,1	0.01150	10,0	86,900	875,1
.0116	.01160		.00007		.01160		86,311	864,1
.0117	.01170		.00007		.01170		85,471	853,5
.0118	.01180		.00007		.01180		84,750	848,2
.0119	.01190		.00007		.01190		84,038	840,1
0.0120	0.01200	10,0	1.00007	0,1	0.01200	10,0	83,437	834,1
.0121	.01210		.00007		.01210		82,649	823,0
.0122	.01220		.00007		.01220		81,971	817,3
.0123	.01230		.00008		.01230		81,305	809,9
.0124	.01240		.00008		.01240		80,649	800,3
0.0125	0.01250	10,0	1.00008	0,1	0.01250	10,0	80,001	799,0
.0126	.01260		.00008		.01260		79,360	793,8
.0127	.01270		.00008		.01270		78,744	787,0
.0128	.01280		.00008		.01280		78,150	780,3
.0129	.01290		.00008		.01290		77,524	770,0
0.0130	0.01300	10,0	1.00008	0,1	0.01300	10,0	76,927	761,7
.0131	.01310		.00009		.01310		76,340	754,7
.0132	.01320		.00009		.01320		75,790	747,9
.0133	.01330		.00009		.01330		75,193	740,3
.0134	.01340		.00009		.01340		74,631	735,0
0.0135	0.01350	10,0	1.00009	0,1	0.01350	10,0	74,070	728,7
.0136	.01360		.00009		.01360		73,531	720,6
.0137	.01370		.00009		.01370		73,007	712,8
.0138	.01380		.00010		.01380		72,468	705,1
.0139	.01390		.00010		.01390		71,917	697,5
0.0140	0.01400	10,0	1.00010	0,1	0.01400	10,0	71,433	690,2
.0141	.01410		.00010		.01410		70,927	683,0
.0142	.01420		.00010		.01420		70,447	675,0
.0143	.01430		.00010		.01430		69,985	667,0
.0144	.01440		.00010		.01440		69,440	659,2
0.0145	0.01450	10,0	1.00011	0,1	0.01450	10,0	68,920	651,6
.0146	.01460		.00011		.01460		68,408	644,1
.0147	.01470		.00011		.01470		67,912	636,7
.0148	.01480		.00011		.01480		67,423	629,5
.0149	.01490		.00011		.01490		67,119	620,4
0.0150	0.01500	10,0	1.00011	0,2	0.01500	10,0	66,672	614,4
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0150	0.01500	10,0	1.00011	0,2	0.01500	10,0	66.672	444,4
.0151	.01510		.00011		.01510		66.230	438,5
.0152	.01520		.00012		.01520		65.795	432,8
.0153	.01530		.00012		.01530		65.365	427,2
.0154	.01540		.00012		.01540		64.940	421,6
0.0155	0.01550	10,0	1.00012	0,2	0.01550	10,0	64.521	416,2
.0156	.01560		.00012		.01560		64.108	410,9
.0157	.01570		.00012		.01570		63.699	405,7
.0158	.01580		.00012		.01580		63.296	400,5
.0159	.01590		.00013		.01590		62.898	395,5
0.0160	0.01600	10,0	1.00013	0,2	0.01600	10,0	62.505	390,6
.0161	.01610		.00013		.01610		62.117	385,8
.0162	.01620		.00013		.01620		61.734	381,0
.0163	.01630		.00013		.01630		61.355	376,3
.0164	.01640		.00013		.01640		60.981	371,8
0.0165	0.01650	10,0	1.00014	0,2	0.01650	10,0	60.612	367,3
.0166	.01660		.00014		.01660		60.247	362,9
.0167	.01670		.00014		.01670		59.886	358,5
.0168	.01680		.00014		.01680		59.529	354,3
.0169	.01690		.00014		.01690		59.177	350,1
0.0170	0.01700	10,0	1.00014	0,2	0.01700	10,0	58.829	346,0
.0171	.01710		.00015		.01710		58.485	342,0
.0172	.01720		.00015		.01720		58.145	338,0
.0173	.01730		.00015		.01730		57.809	334,1
.0174	.01740		.00015		.01740		57.477	330,3
0.0175	0.01750	10,0	1.00015	0,2	0.01750	10,0	57.149	326,5
.0176	.01760		.00015		.01760		56.824	322,8
.0177	.01770		.00016		.01770		56.503	319,2
.0178	.01780		.00016		.01780		56.185	315,6
.0179	.01790		.00016		.01790		55.872	312,1
0.0180	0.01800	10,0	1.00016	0,2	0.01800	10,0	55.562	308,6
.0181	.01810		.00016		.01810		55.255	305,2
.0182	.01820		.00017		.01820		54.951	301,9
.0183	.01830		.00017		.01830		54.651	298,6
.0184	.01840		.00017		.01840		54.354	295,3
0.0185	0.01850	10,0	1.00017	0,2	0.01850	10,0	54.060	292,2
.0186	.01860		.00017		.01860		53.770	289,0
.0187	.01870		.00017		.01870		53.482	285,9
.0188	.01880		.00018		.01880		53.198	282,9
.0189	.01890		.00018		.01890		52.916	279,9
0.0190	0.01900	10,0	1.00018	0,2	0.01900	10,0	52.638	277,0
.0191	.01910		.00018		.01910		52.362	274,1
.0192	.01920		.00018		.01920		52.090	271,2
.0193	.01930		.00019		.01930		51.820	268,4
.0194	.01940		.00019		.01940		51.553	265,7
0.0195	0.01950	10,0	1.00019	0,2	0.01950	10,0	51.289	263,0
.0196	.01960		.00019		.01960		51.027	260,3
.0197	.01970		.00019		.01970		50.768	257,6
.0198	.01980		.00020		.01980		50.512	255,0
.0199	.01990		.00020		.01990		50.258	252,5
0.0200	0.02000	10,0	1.00020	0,2	0.02000	10,0	50.007	250,0
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\cosh u$	$\tanh u$	$\coth u$	$\sinh u$	$\cosh u$	$\tanh u$	$\coth u$
0.0200	0.02000	1.00020	0.2	0.02000	10.0	50.000	50.0	50.0
0.0201	0.02010	1.00020	0.2010	49.758	49.758	50.0	50.0	50.0
0.0202	0.02020	1.00020	0.2020	49.517	49.517	50.0	50.0	50.0
0.0203	0.02030	1.00021	0.2030	49.276	49.276	50.0	50.0	50.0
0.0204	0.02040	1.00021	0.2040	49.035	49.035	50.0	50.0	50.0
0.0205	0.02050	1.00021	0.2050	48.794	48.794	50.0	50.0	50.0
0.0206	0.02060	1.00021	0.2060	48.553	48.553	50.0	50.0	50.0
0.0207	0.02070	1.00021	0.2070	48.312	48.312	50.0	50.0	50.0
0.0208	0.02080	1.00022	0.2080	48.071	48.071	50.0	50.0	50.0
0.0209	0.02090	1.00022	0.2090	47.830	47.830	50.0	50.0	50.0
0.0210	0.02100	1.00022	0.2100	47.589	47.589	50.0	50.0	50.0
0.0211	0.02110	1.00022	0.2110	47.348	47.348	50.0	50.0	50.0
0.0212	0.02120	1.00022	0.2120	47.107	47.107	50.0	50.0	50.0
0.0213	0.02130	1.00023	0.2130	46.866	46.866	50.0	50.0	50.0
0.0214	0.02140	1.00023	0.2140	46.625	46.625	50.0	50.0	50.0
0.0215	0.02150	1.00023	0.2150	46.384	46.384	50.0	50.0	50.0
0.0216	0.02160	1.00023	0.2160	46.143	46.143	50.0	50.0	50.0
0.0217	0.02170	1.00024	0.2170	45.902	45.902	50.0	50.0	50.0
0.0218	0.02180	1.00024	0.2180	45.661	45.661	50.0	50.0	50.0
0.0219	0.02190	1.00024	0.2190	45.420	45.420	50.0	50.0	50.0
0.0220	0.02200	1.00024	0.2200	45.179	45.179	50.0	50.0	50.0
0.0221	0.02210	1.00025	0.2210	44.938	44.938	50.0	50.0	50.0
0.0222	0.02220	1.00025	0.2220	44.697	44.697	50.0	50.0	50.0
0.0223	0.02230	1.00025	0.2230	44.456	44.456	50.0	50.0	50.0
0.0224	0.02240	1.00025	0.2240	44.215	44.215	50.0	50.0	50.0
0.0225	0.02250	1.00025	0.2250	43.974	43.974	50.0	50.0	50.0
0.0226	0.02260	1.00026	0.2260	43.733	43.733	50.0	50.0	50.0
0.0227	0.02270	1.00026	0.2270	43.492	43.492	50.0	50.0	50.0
0.0228	0.02280	1.00026	0.2280	43.251	43.251	50.0	50.0	50.0
0.0229	0.02290	1.00026	0.2290	43.010	43.010	50.0	50.0	50.0
0.0230	0.02300	1.00026	0.2300	42.769	42.769	50.0	50.0	50.0
0.0231	0.02310	1.00027	0.2310	42.528	42.528	50.0	50.0	50.0
0.0232	0.02320	1.00027	0.2320	42.287	42.287	50.0	50.0	50.0
0.0233	0.02330	1.00027	0.2330	42.046	42.046	50.0	50.0	50.0
0.0234	0.02340	1.00027	0.2340	41.805	41.805	50.0	50.0	50.0
0.0235	0.02350	1.00028	0.2350	41.564	41.564	50.0	50.0	50.0
0.0236	0.02360	1.00028	0.2360	41.323	41.323	50.0	50.0	50.0
0.0237	0.02370	1.00028	0.2370	41.082	41.082	50.0	50.0	50.0
0.0238	0.02380	1.00028	0.2380	40.841	40.841	50.0	50.0	50.0
0.0239	0.02390	1.00029	0.2390	40.600	40.600	50.0	50.0	50.0
0.0240	0.02400	1.00029	0.2400	40.359	40.359	50.0	50.0	50.0
0.0241	0.02410	1.00029	0.2410	40.118	40.118	50.0	50.0	50.0
0.0242	0.02420	1.00029	0.2420	39.877	39.877	50.0	50.0	50.0
0.0243	0.02430	1.00030	0.2430	39.636	39.636	50.0	50.0	50.0
0.0244	0.02440	1.00030	0.2440	39.395	39.395	50.0	50.0	50.0
0.0245	0.02450	1.00030	0.2450	39.154	39.154	50.0	50.0	50.0
0.0246	0.02460	1.00031	0.2460	38.913	38.913	50.0	50.0	50.0
0.0247	0.02470	1.00031	0.2470	38.672	38.672	50.0	50.0	50.0
0.0248	0.02480	1.00031	0.2480	38.431	38.431	50.0	50.0	50.0
0.0249	0.02490	1.00031	0.2490	38.190	38.190	50.0	50.0	50.0
0.0250	0.02500	1.00031	0.2500	37.949	37.949	50.0	50.0	50.0
0.0251	0.02510	1.00032	0.2510	37.708	37.708	50.0	50.0	50.0
0.0252	0.02520	1.00032	0.2520	37.467	37.467	50.0	50.0	50.0
0.0253	0.02530	1.00032	0.2530	37.226	37.226	50.0	50.0	50.0
0.0254	0.02540	1.00032	0.2540	36.985	36.985	50.0	50.0	50.0
0.0255	0.02550	1.00032	0.2550	36.744	36.744	50.0	50.0	50.0
0.0256	0.02560	1.00033	0.2560	36.503	36.503	50.0	50.0	50.0
0.0257	0.02570	1.00033	0.2570	36.262	36.262	50.0	50.0	50.0
0.0258	0.02580	1.00033	0.2580	36.021	36.021	50.0	50.0	50.0
0.0259	0.02590	1.00033	0.2590	35.780	35.780	50.0	50.0	50.0
0.0260	0.02600	1.00033	0.2600	35.539	35.539	50.0	50.0	50.0

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
0.0250	0.02500	10.0	1.00031	0.3	0.02490	10.0	40.008	160.0
.0251	.02510		.00032		.02500		39.849	158.7
.0252	.02520		.00032		.02510		39.691	157.4
.0253	.02530		.00032		.02520		39.534	156.2
.0254	.02540		.00032		.02530		39.379	155.0
0.0255	0.02550	10.0	1.00033	0.3	0.02540	10.0	39.224	153.8
.0256	.02560		.00033		.02550		39.071	152.6
.0257	.02570		.00033		.02560		38.919	151.4
.0258	.02580		.00033		.02570		38.768	150.2
.0259	.02590		.00034		.02580		38.619	149.0
0.0260	0.02600	10.0	1.00034	0.3	0.02590	10.0	38.470	147.9
.0261	.02610		.00034		.02600		38.323	146.8
.0262	.02620		.00034		.02610		38.177	145.7
.0263	.02630		.00035		.02620		38.032	144.5
.0264	.02640		.00035		.02630		37.888	143.4
0.0265	0.02650	10.0	1.00035	0.3	0.02640	10.0	37.745	142.4
.0266	.02660		.00035		.02650		37.603	141.3
.0267	.02670		.00036		.02660		37.462	140.2
.0268	.02680		.00036		.02670		37.322	139.2
.0269	.02690		.00036		.02680		37.181	138.2
0.0270	0.02700	10.0	1.00036	0.3	0.02690	10.0	37.040	137.1
.0271	.02710		.00037		.02700		36.900	136.1
.0272	.02720		.00037		.02710		36.761	135.1
.0273	.02730		.00037		.02720		36.620	134.1
.0274	.02740		.00038		.02730		36.505	133.2
0.0275	0.02750	10.0	1.00038	0.3	0.02740	10.0	36.373	132.2
.0276	.02760		.00038		.02750		36.241	131.2
.0277	.02770		.00038		.02760		36.110	130.3
.0278	.02780		.00039		.02770		35.980	129.4
.0279	.02790		.00039		.02780		35.852	128.4
0.0280	0.02800	10.0	1.00039	0.3	0.02790	10.0	35.724	127.5
.0281	.02810		.00040		.02800		35.597	126.6
.0282	.02820		.00040		.02810		35.470	125.7
.0283	.02830		.00040		.02820		35.345	124.8
.0284	.02840		.00040		.02830		35.221	124.0
0.0285	0.02850	10.0	1.00041	0.3	0.02840	10.0	35.097	123.2
.0286	.02860		.00041		.02850		34.975	122.3
.0287	.02870		.00041		.02860		34.853	121.4
.0288	.02880		.00041		.02870		34.732	120.5
.0289	.02890		.00042		.02880		34.612	119.7
0.0290	0.02900	10.0	1.00042	0.3	0.02890	10.0	34.492	118.9
.0291	.02910		.00042		.02900		34.374	118.1
.0292	.02920		.00043		.02910		34.256	117.2
.0293	.02930		.00043		.02920		34.139	116.4
.0294	.02940		.00043		.02930		34.023	115.7
0.0295	0.02950	10.0	1.00044	0.3	0.02940	10.0	33.908	114.9
.0296	.02960		.00044		.02950		33.794	114.1
.0297	.02970		.00044		.02960		33.680	113.3
.0298	.02980		.00044		.02970		33.567	112.6
.0299	.02990		.00045		.02980		33.455	111.8
0.0300	0.03000	10.0	1.00045	0.3	0.02990	10.0	33.343	111.1
$u$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$	tanh u	$\infty F_0'$	coth u	$\infty F_0'$
0.0300	0.03000	10.0	1.00045	0.3	0.02999	10.0	33.343	111.1
.0301	.03010		.00045		.03000		33.343	110.3
.0302	.03020		.00046		.03010		33.343	109.6
.0303	.03030		.00046		.03020		33.343	108.9
.0304	.03040		.00046		.03030		33.343	108.2
0.0305	0.03050	10.0	1.00047	0.3	0.03049	10.0	33.343	107.5
.0306	.03060		.00047		.03050		33.343	106.8
.0307	.03070		.00047		.03060		33.343	106.1
.0308	.03080		.00047		.03070		33.343	105.4
.0309	.03090		.00048		.03080		33.343	104.7
0.0310	0.03100	10.0	1.00048	0.3	0.03099	10.0	33.343	104.0
.0311	.03111		.00048		.03100		33.343	103.4
.0312	.03121		.00049		.03110		33.343	102.7
.0313	.03131		.00049		.03120		33.343	102.0
.0314	.03141		.00049		.03130		33.343	101.4
0.0315	0.03151	10.0	1.00050	0.3	0.03149	10.0	33.343	100.7
.0316	.03161		.00050		.03150		33.343	100.1
.0317	.03171		.00050		.03160		33.343	99.5
.0318	.03181		.00051		.03170		33.343	98.9
.0319	.03191		.00051		.03180		33.343	98.2
0.0320	0.03201	10.0	1.00051	0.3	0.03199	10.0	33.343	97.6
.0321	.03211		.00052		.03200		33.343	97.0
.0322	.03221		.00052		.03210		33.343	96.4
.0323	.03231		.00052		.03220		33.343	95.8
.0324	.03241		.00052		.03230		33.343	95.2
0.0325	0.03251	10.0	1.00053	0.3	0.03249	10.0	33.343	94.6
.0326	.03261		.00053		.03250		33.343	94.0
.0327	.03271		.00053		.03260		33.343	93.5
.0328	.03281		.00054		.03270		33.343	92.9
.0329	.03291		.00054		.03280		33.343	92.4
0.0330	0.03301	10.0	1.00054	0.3	0.03299	10.0	33.343	91.8
.0331	.03311		.00055		.03300		33.343	91.2
.0332	.03321		.00055		.03310		33.343	90.7
.0333	.03331		.00055		.03320		33.343	90.1
.0334	.03341		.00056		.03330		33.343	89.6
0.0335	0.03351	10.0	1.00056	0.3	0.03349	10.0	33.343	89.1
.0336	.03361		.00056		.03350		33.343	88.5
.0337	.03371		.00057		.03360		33.343	88.0
.0338	.03381		.00057		.03370		33.343	87.5
.0339	.03391		.00057		.03380		33.343	87.0
0.0340	0.03401	10.0	1.00058	0.3	0.03399	10.0	33.343	86.6
.0341	.03411		.00058		.03400		33.343	86.0
.0342	.03421		.00058		.03410		33.343	85.5
.0343	.03431		.00059		.03420		33.343	85.0
.0344	.03441		.00059		.03430		33.343	84.5
0.0345	0.03451	10.0	1.00060	0.3	0.03449	10.0	33.343	84.0
.0346	.03461		.00060		.03450		33.343	83.5
.0347	.03471		.00060		.03460		33.343	83.0
.0348	.03481		.00061		.03470		33.343	82.5
.0349	.03491		.00061		.03480		33.343	82.1
0.0350	0.03501	10.0	1.00061	0.4	0.03499	10.0	33.343	81.6
u	tanh u	$\infty F_0'$	sec gd u	$\infty F_0'$	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0350	0.03501	10.0	1.00061	0.4	0.03499	10.0	28.583	81.6
.0351	.03511		.00062		.03509		28.502	81.1
.0352	.03521		.00062		.03519		28.421	80.7
.0353	.03531		.00062		.03529		28.340	80.2
.0354	.03541		.00063		.03539		28.260	79.8
0.0355	0.03551	10.0	1.00063	0.4	0.03549	10.0	28.181	79.3
.0356	.03561		.00063		.03558		28.102	78.9
.0357	.03571		.00064		.03568		28.023	78.4
.0358	.03581		.00064		.03578		27.945	78.0
.0359	.03591		.00064		.03588		27.867	77.6
0.0360	0.03601	10.0	1.00065	0.4	0.03598	10.0	27.790	77.1
.0361	.03611		.00065		.03608		27.713	76.7
.0362	.03621		.00065		.03618		27.636	76.3
.0363	.03631		.00066		.03628		27.560	75.9
.0364	.03641		.00066		.03638		27.485	75.4
0.0365	0.03651	10.0	1.00067	0.4	0.03648	10.0	27.409	75.0
.0366	.03661		.00067		.03658		27.335	74.6
.0367	.03671		.00067		.03668		27.260	74.2
.0368	.03681		.00068		.03678		27.186	73.8
.0369	.03691		.00068		.03688		27.113	73.4
0.0370	0.03701	10.0	1.00068	0.4	0.03698	10.0	27.039	73.0
.0371	.03711		.00069		.03708		26.967	72.6
.0372	.03721		.00069		.03718		26.894	72.2
.0373	.03731		.00070		.03728		26.822	71.8
.0374	.03741		.00070		.03738		26.750	71.5
0.0375	0.03751	10.0	1.00070	0.4	0.03748	10.0	26.679	71.1
.0376	.03761		.00071		.03758		26.608	70.7
.0377	.03771		.00071		.03768		26.538	70.3
.0378	.03781		.00071		.03778		26.468	70.0
.0379	.03791		.00072		.03788		26.398	69.6
0.0380	0.03801	10.0	1.00072	0.4	0.03798	10.0	26.328	69.2
.0381	.03811		.00073		.03808		26.259	68.9
.0382	.03821		.00073		.03818		26.191	68.5
.0383	.03831		.00073		.03828		26.122	68.1
.0384	.03841		.00074		.03838		26.054	67.8
0.0385	0.03851	10.0	1.00074	0.4	0.03848	10.0	25.987	67.4
.0386	.03861		.00075		.03858		25.920	67.1
.0387	.03871		.00075		.03868		25.853	66.7
.0388	.03881		.00075		.03878		25.786	66.4
.0389	.03891		.00076		.03888		25.720	66.1
0.0390	0.03901	10.0	1.00076	0.4	0.03898	10.0	25.654	65.7
.0391	.03911		.00076		.03908		25.588	65.4
.0392	.03921		.00077		.03918		25.523	65.0
.0393	.03931		.00077		.03928		25.458	64.7
.0394	.03941		.00078		.03938		25.394	64.4
0.0395	0.03951	10.0	1.00078	0.4	0.03948	10.0	25.330	64.1
.0396	.03961		.00078		.03958		25.266	63.7
.0397	.03971		.00079		.03968		25.202	63.4
.0398	.03981		.00079		.03978		25.139	63.1
.0399	.03991		.00080		.03988		25.076	62.8
0.0400	0.04001	10.0	1.00080	0.4	0.03998	10.0	25.013	62.5
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$



# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0100	0.01001	10,0	1.00080	0,4	0.03098	10,0	25.013	62,5
.0101	.01011		.00080		.04008		21.951	62,2
.0102	.01021		.00081		.04018		21.889	61,8
.0103	.01031		.00081		.04028		21.827	61,5
.0104	.01041		.00082		.04038		21.766	61,2
0.0105	0.01051	10,0	1.00083	0,4	0.04048	10,0	21.705	60,8
.0106	.01061		.00082		.04058		21.644	60,6
.0107	.01071		.00083		.04068		21.584	60,3
.0108	.01081		.00083		.04078		21.523	60,0
.0109	.01091		.00084		.04088		21.464	59,7
0.0110	0.01101	10,0	1.00084	0,4	0.04098	10,0	21.404	59,5
.0111	.01111		.00084		.04108		21.345	59,2
.0112	.01121		.00085		.04118		21.285	58,9
.0113	.01131		.00085		.04128		21.227	58,7
.0114	.01141		.00085		.04138		21.168	58,3
0.0115	0.01151	10,0	1.00086	0,4	0.04148	10,0	21.110	58,0
.0116	.01161		.00087		.04158		21.052	57,8
.0117	.01171		.00087		.04168		20.995	57,5
.0118	.01181		.00087		.04178		20.937	57,2
.0119	.01191		.00088		.04188		20.880	56,9
0.0120	0.01201	10,0	1.00088	0,4	0.04198	10,0	20.824	56,7
.0121	.01211		.00089		.04208		20.767	56,4
.0122	.01221		.00089		.04217		20.711	56,1
.0123	.01231		.00089		.04227		20.655	55,9
.0124	.01241		.00090		.04237		20.599	55,6
0.0125	0.01251	10,0	1.00090	0,4	0.04247	10,0	20.544	55,3
.0126	.01261		.00091		.04257		20.488	55,1
.0127	.01271		.00091		.04267		20.433	54,8
.0128	.01281		.00092		.04277		20.379	54,6
.0129	.01291		.00092		.04287		20.324	54,3
0.0130	0.01301	10,0	1.00092	0,4	0.04297	10,0	20.270	54,0
.0131	.01311		.00093		.04307		20.216	53,8
.0132	.01321		.00093		.04317		20.163	53,6
.0133	.01331		.00094		.04327		20.109	53,3
.0134	.01341		.00094		.04337		20.056	53,1
0.0135	0.01351	10,0	1.00095	0,4	0.04347	10,0	20.003	52,8
.0136	.01361		.00095		.04357		21.950	52,6
.0137	.01371		.00095		.04367		21.898	52,3
.0138	.01381		.00096		.04377		21.846	52,1
.0139	.01391		.00096		.04387		21.794	51,9
0.0140	0.01401	10,0	1.00097	0,4	0.04397	10,0	21.742	51,6
.0141	.01411		.00097		.04407		21.690	51,4
.0142	.01421		.00098		.04417		21.639	51,2
.0143	.01431		.00098		.04427		21.588	50,9
.0144	.01441		.00099		.04437		21.537	50,7
0.0145	0.01451	10,0	1.00099	0,4	0.04447	10,0	21.487	50,5
.0146	.01461		.00099		.04457		21.436	50,2
.0147	.01471		.00100		.04467		21.386	50,0
.0148	.01481		.00100		.04477		21.336	49,8
.0149	.01492		.00101		.04487		21.287	49,6
0.0150	0.01502	10,0	1.00101	0,5	0.04497	10,0	21.237	49,3
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0150	0.01502	10.0	1.00101	0.5	0.01497	10.0	22.237	49.3
.0151	.01512		.00102		.01507		22.188	49.1
.0152	.01522		.00102		.01517		22.139	48.9
.0153	.01532		.00103		.01527		22.090	48.7
.0154	.01542		.00103		.01537		22.042	48.5
0.0155	0.01552	10.0	1.00104	0.5	0.01547	10.0	21.993	48.3
.0156	.01562		.00104		.01557		21.945	48.1
.0157	.01572		.00104		.01567		21.897	47.8
.0158	.01582		.00105		.01577		21.849	47.6
.0159	.01592		.00105		.01587		21.802	47.4
0.0160	0.01602	10.0	1.00106	0.5	0.01597	10.0	21.754	47.2
.0161	.01612		.00106		.01607		21.707	47.0
.0162	.01622		.00107		.01617		21.660	46.8
.0163	.01632		.00107		.01627		21.614	46.6
.0164	.01642		.00108		.01637		21.567	46.4
0.0165	0.01652	10.0	1.00108	0.5	0.01647	10.0	21.521	46.2
.0166	.01662		.00109		.01657		21.475	46.0
.0167	.01672		.00109		.01667		21.429	45.8
.0168	.01682		.00110		.01677		21.383	45.6
.0169	.01692		.00110		.01687		21.338	45.4
0.0170	0.01702	10.0	1.00110	0.5	0.01697	10.0	21.292	45.2
.0171	.01712		.00111		.01707		21.247	45.0
.0172	.01722		.00111		.01716		21.202	44.9
.0173	.01732		.00112		.01726		21.157	44.7
.0174	.01742		.00112		.01736		21.113	44.5
0.0175	0.01752	10.0	1.00113	0.5	0.01746	10.0	21.068	44.3
.0176	.01762		.00113		.01756		21.024	44.1
.0177	.01772		.00114		.01766		20.980	43.9
.0178	.01782		.00114		.01776		20.936	43.7
.0179	.01792		.00115		.01786		20.893	43.6
0.0180	0.01802	10.0	1.00115	0.5	0.01796	10.0	20.849	43.4
.0181	.01812		.00116		.01806		20.805	43.2
.0182	.01822		.00116		.01816		20.763	43.0
.0183	.01832		.00117		.01826		20.720	42.8
.0184	.01842		.00117		.01836		20.677	42.7
0.0185	0.01852	10.0	1.00118	0.5	0.01846	10.0	20.635	42.5
.0186	.01862		.00118		.01856		20.592	42.3
.0187	.01872		.00119		.01866		20.550	42.1
.0188	.01882		.00119		.01876		20.508	42.0
.0189	.01892		.00120		.01886		20.466	41.8
0.0190	0.01902	10.0	1.00120	0.5	0.01896	10.0	20.424	41.6
.0191	.01912		.00121		.01906		20.383	41.4
.0192	.01922		.00121		.01916		20.342	41.3
.0193	.01932		.00122		.01926		20.300	41.1
.0194	.01942		.00122		.01936		20.259	40.9
0.0195	0.01952	10.0	1.00123	0.5	0.01946	10.0	20.219	40.8
.0196	.01962		.00123		.01956		20.178	40.6
.0197	.01972		.00124		.01966		20.137	40.5
.0198	.01982		.00124		.01976		20.097	40.3
.0199	.01992		.00125		.01986		20.057	40.1
0.0500	0.05002	10.0	1.00125	0.5	0.04996	10.0	20.017	40.0
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0500	0.05002	10,0	1.00125	0,5	0.04996	10,0	20.017	40,0
.0501	.05012		.00126		.05000		19.977	39,8
.0502	.05022		.00126		.05016		19.937	39,6
.0503	.05032		.00127		.05036		19.897	39,5
.0504	.05042		.00127		.05056		19.858	39,3
0.0505	0.05052	10,0	1.00128	0,5	0.05040	10,0	19.819	39,2
.0506	.05062		.00128		.05056		19.780	39,0
.0507	.05072		.00129		.05086		19.741	38,9
.0508	.05082		.00129		.05096		19.702	38,7
.0509	.05092		.00130		.05086		19.663	38,6
0.0510	0.05102	10,0	1.00130	0,5	0.05096	10,0	19.625	38,4
.0511	.05112		.00131		.05106		19.587	38,3
.0512	.05122		.00131		.05116		19.548	38,1
.0513	.05132		.00132		.05126		19.510	38,0
.0514	.05142		.00132		.05135		19.473	37,8
0.0515	0.05152	10,0	1.00133	0,5	0.05145	10,0	19.435	37,7
.0516	.05162		.00133		.05155		19.397	37,5
.0517	.05172		.00134		.05165		19.360	37,4
.0518	.05182		.00134		.05175		19.323	37,2
.0519	.05192		.00135		.05185		19.285	37,1
0.0520	0.05202	10,0	1.00135	0,5	0.05195	10,0	19.248	36,9
.0521	.05212		.00136		.05205		19.211	36,8
.0522	.05222		.00136		.05215		19.174	36,7
.0523	.05232		.00137		.05225		19.138	36,5
.0524	.05242		.00137		.05235		19.101	36,4
0.0525	0.05252	10,0	1.00138	0,5	0.05245	10,0	19.065	36,2
.0526	.05262		.00138		.05255		19.029	36,1
.0527	.05272		.00139		.05265		18.993	36,0
.0528	.05282		.00139		.05275		18.957	35,8
.0529	.05292		.00140		.05285		18.921	35,7
0.0530	0.05302	10,0	1.00140	0,5	0.05295	10,0	18.886	35,6
.0531	.05312		.00141		.05305		18.850	35,4
.0532	.05322		.00142		.05315		18.815	35,3
.0533	.05332		.00142		.05325		18.779	35,2
.0534	.05342		.00143		.05335		18.744	35,0
0.0535	0.05352	10,0	1.00143	0,5	0.05345	10,0	18.709	34,9
.0536	.05362		.00144		.05355		18.675	34,8
.0537	.05372		.00144		.05365		18.640	34,6
.0538	.05382		.00145		.05375		18.605	34,5
.0539	.05392		.00145		.05385		18.571	34,4
0.0540	0.05402	10,0	1.00146	0,5	0.05395	10,0	18.537	34,3
.0541	.05412		.00146		.05405		18.502	34,1
.0542	.05422		.00147		.05415		18.468	34,0
.0543	.05432		.00147		.05425		18.434	33,9
.0544	.05442		.00148		.05435		18.400	33,8
0.0545	0.05452	10,0	1.00149	0,5	0.05445	10,0	18.367	33,6
.0546	.05462		.00149		.05455		18.333	33,5
.0547	.05472		.00150		.05465		18.300	33,4
.0548	.05482		.00150		.05475		18.266	33,3
.0549	.05492		.00151		.05485		18.233	33,1
0.0550	0.05502	10,0	1.00151	0,6	0.05494	10,0	18.200	33,0
u	ln gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
0.0550	0.05503	10.0	1.00151	0.6	0.05494	10.0	18.200	33.0
.0551	.05513		.00152		.05501		18.167	32.9
.0552	.05523		.00153		.05514		18.134	32.8
.0553	.05533		.00153		.05524		18.102	32.7
.0554	.05543		.00153		.05534		18.069	32.5
0.0555	0.05553	10.0	1.00154	0.6	0.05544	10.0	18.037	32.4
.0556	.05563		.00155		.05554		18.001	32.3
.0557	.05573		.00155		.05561		17.972	32.2
.0558	.05583		.00156		.05571		17.940	32.1
.0559	.05593		.00156		.05584		17.908	32.0
0.0560	0.05603	10.0	1.00157	0.6	0.05594	10.0	17.876	31.9
.0561	.05613		.00157		.05604		17.844	31.7
.0562	.05623		.00158		.05614		17.812	31.6
.0563	.05633		.00159		.05624		17.781	31.5
.0564	.05643		.00159		.05634		17.749	31.4
0.0565	0.05653	10.0	1.00160	0.6	0.05644	10.0	17.718	31.3
.0566	.05663		.00160		.05654		17.687	31.2
.0567	.05673		.00161		.05664		17.656	31.1
.0568	.05683		.00161		.05674		17.625	31.0
.0569	.05693		.00162		.05684		17.594	30.9
0.0570	0.05703	10.0	1.00163	0.6	0.05694	10.0	17.563	30.7
.0571	.05713		.00163		.05704		17.532	30.6
.0572	.05723		.00164		.05714		17.502	30.5
.0573	.05733		.00164		.05724		17.471	30.4
.0574	.05743		.00165		.05734		17.441	30.3
0.0575	0.05753	10.0	1.00165	0.6	0.05744	10.0	17.410	30.2
.0576	.05763		.00166		.05754		17.380	30.1
.0577	.05773		.00167		.05764		17.350	30.0
.0578	.05783		.00167		.05774		17.320	29.9
.0579	.05793		.00168		.05784		17.290	29.8
0.0580	0.05803	10.0	1.00168	0.6	0.05794	10.0	17.261	29.7
.0581	.05813		.00169		.05803		17.231	29.6
.0582	.05823		.00169		.05813		17.202	29.5
.0583	.05833		.00170		.05823		17.172	29.4
.0584	.05843		.00171		.05833		17.143	29.3
0.0585	0.05853	10.0	1.00171	0.6	0.05843	10.0	17.114	29.2
.0586	.05863		.00172		.05853		17.084	29.1
.0587	.05873		.00172		.05863		17.055	29.0
.0588	.05883		.00173		.05873		17.026	28.9
.0589	.05893		.00174		.05883		16.998	28.8
0.0590	0.05903	10.0	1.00174	0.6	0.05893	10.0	16.969	28.7
.0591	.05913		.00175		.05903		16.940	28.6
.0592	.05923		.00175		.05913		16.912	28.5
.0593	.05933		.00176		.05923		16.883	28.4
.0594	.05943		.00176		.05933		16.855	28.3
0.0595	0.05954	10.0	1.00177	0.6	0.05943	10.0	16.827	28.2
.0596	.05964		.00178		.05953		16.798	28.1
.0597	.05974		.00178		.05963		16.770	28.0
.0598	.05984		.00179		.05973		16.742	27.9
.0599	.05994		.00179		.05983		16.714	27.8
0.0600	0.06004	10.0	1.00180	0.6	0.05993	10.0	16.687	27.7
$u$	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$
0.0500	0.05001	10.0	1.00180	0.6	0.05003	10.0	10.037	27.7
.0501	.05014		.00181		.05003		10.039	27.7
.0502	.05023		.00181		.05013		10.041	27.6
.0503	.05034		.00182		.05023		10.043	27.5
.0504	.05044		.00182		.05033		10.046	27.4
0.0505	0.05054	10.0	1.00183	0.6	0.05043	10.0	10.049	27.3
.0506	.05064		.00184		.05053		10.052	27.3
.0507	.05074		.00184		.05063		10.055	27.1
.0508	.05084		.00185		.05073		10.058	27.0
.0509	.05094		.00185		.05083		10.061	27.0
0.0510	0.05104	10.0	1.00186	0.6	0.05093	10.0	10.064	26.8
.0511	.05114		.00187		.05103		10.067	26.8
.0512	.05124		.00187		.05113		10.069	26.7
.0513	.05134		.00188		.05123		10.071	26.6
.0514	.05144		.00189		.05133		10.074	26.5
0.0515	0.05154	10.0	1.00189	0.6	0.05143	10.0	10.077	26.4
.0516	.05164		.00190		.05153		10.080	26.3
.0517	.05174		.00190		.05163		10.083	26.3
.0518	.05184		.00191		.05173		10.085	26.1
.0519	.05194		.00192		.05183		10.088	26.1
0.0520	0.05204	10.0	1.00192	0.6	0.05193	10.0	10.091	26.0
.0521	.05214		.00193		.05203		10.094	26.0
.0522	.05224		.00194		.05213		10.096	25.8
.0523	.05234		.00194		.05223		10.099	25.7
.0524	.05244		.00195		.05233		10.102	25.6
0.0525	0.05254	10.0	1.00195	0.6	0.05243	10.0	10.105	25.6
.0526	.05264		.00196		.05253		15.095	25.5
.0527	.05274		.00197		.05263		15.097	25.4
.0528	.05284		.00197		.05273		15.099	25.3
.0529	.05294		.00198		.05283		15.101	25.2
0.0530	0.05304	10.0	1.00199	0.6	0.05293	10.0	15.104	25.2
.0531	.05314		.00199		.05303		15.106	25.1
.0532	.05324		.00200		.05313		15.108	25.0
.0533	.05334		.00200		.05323		15.110	24.9
.0534	.05344		.00201		.05333		15.112	24.8
0.0535	0.05354	10.0	1.00202	0.6	0.05343	10.0	15.115	24.8
.0536	.05364		.00202		.05353		15.117	24.7
.0537	.05374		.00203		.05363		15.119	24.6
.0538	.05384		.00204		.05373		15.121	24.5
.0539	.05394		.00204		.05383		15.123	24.5
0.0540	0.05404	10.0	1.00205	0.6	0.05393	10.0	15.126	24.4
.0541	.05414		.00206		.05403		15.128	24.3
.0542	.05424		.00206		.05413		15.130	24.3
.0543	.05434		.00207		.05423		15.132	24.2
.0544	.05444		.00207		.05433		15.134	24.1
0.0545	0.05454	10.0	1.00208	0.6	0.05443	10.0	15.137	24.0
.0546	.05464		.00209		.05453		15.139	24.0
.0547	.05474		.00209		.05463		15.141	23.9
.0548	.05484		.00210		.05473		15.143	23.8
.0549	.05494		.00211		.05483		15.145	23.7
0.0550	0.05505	10.0	1.00211	0.7	0.05493	10.0	15.148	23.6
u	tan gd u	$\omega F_u'$	sec gd u	$\omega F_u'$	sin gd u	$\omega F_u'$	cos gd u	$\omega F_u'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$
0.0050	0.005005	10.0	1.002511	0.7	0.005191	10.0	15.106	23.6
0.0051	0.005115		1.002512		0.00501		15.383	23.6
0.0052	0.005225		1.002513		0.00511		15.359	23.5
0.0053	0.005335		1.002514		0.00521		15.335	23.4
0.0054	0.005445		1.002514		0.00531		15.312	23.3
0.0055	0.005555	10.0	1.002515	0.7	0.00541	10.0	15.289	23.3
0.0056	0.005665		1.002515		0.00551		15.266	23.2
0.0057	0.005775		1.002516		0.00561		15.243	23.1
0.0058	0.005885		1.002517		0.00571		15.219	23.1
0.0059	0.005995		1.002517		0.00581		15.196	23.0
0.0060	0.006005	10.0	1.002518	0.7	0.00590	10.0	15.174	22.9
0.0061	0.006115		1.002519		0.00600		15.151	22.9
0.0062	0.006225		1.002519		0.00610		15.128	22.8
0.0063	0.006335		1.002520		0.00620		15.105	22.7
0.0064	0.006445		1.002521		0.00630		15.082	22.6
0.0065	0.006555	10.0	1.002521	0.7	0.00640	10.0	15.060	22.6
0.0066	0.006665		1.002522		0.00650		15.037	22.5
0.0067	0.006775		1.002523		0.00660		15.015	22.4
0.0068	0.006885		1.002523		0.00670		14.992	22.4
0.0069	0.006995		1.002524		0.00680		14.970	22.3
0.0070	0.007005	10.0	1.002525	0.7	0.00690	10.0	14.948	22.2
0.0071	0.007115		1.002525		0.00700		14.925	22.2
0.0072	0.007225		1.002526		0.00710		14.903	22.1
0.0073	0.007335		1.002527		0.00720		14.881	22.0
0.0074	0.007445		1.002527		0.00730		14.859	22.0
0.0075	0.007555	10.0	1.002528	0.7	0.00740	10.0	14.837	21.9
0.0076	0.007665		1.002529		0.00750		14.815	21.8
0.0077	0.007775		1.002529		0.00760		14.794	21.8
0.0078	0.007885		1.002530		0.00770		14.772	21.7
0.0079	0.007995		1.002531		0.00780		14.750	21.7
0.0080	0.008005	10.0	1.002531	0.7	0.00790	10.0	14.729	21.6
0.0081	0.008115		1.002532		0.00799		14.707	21.5
0.0082	0.008225		1.002533		0.00809		14.685	21.5
0.0083	0.008335		1.002533		0.00819		14.664	21.4
0.0084	0.008445		1.002534		0.00829		14.643	21.3
0.0085	0.008555	10.0	1.002535	0.7	0.00839	10.0	14.621	21.3
0.0086	0.008665		1.002535		0.00849		14.600	21.2
0.0087	0.008775		1.002536		0.00859		14.579	21.2
0.0088	0.008885		1.002537		0.00869		14.558	21.1
0.0089	0.008995		1.002537		0.00879		14.537	21.0
0.0090	0.009005	10.0	1.002538	0.7	0.00889	10.0	14.516	21.0
0.0091	0.009115		1.002539		0.00899		14.495	20.9
0.0092	0.009225		1.002540		0.00909		14.474	20.8
0.0093	0.009335		1.002540		0.00919		14.453	20.8
0.0094	0.009445		1.002541		0.00929		14.432	20.7
0.0095	0.009555	10.0	1.002542	0.7	0.00939	10.0	14.412	20.7
0.0096	0.009665		1.002542		0.00949		14.391	20.6
0.0097	0.009775		1.002543		0.00959		14.370	20.6
0.0098	0.009885		1.002544		0.00969		14.350	20.5
0.0099	0.009995		1.002544		0.00979		14.329	20.4
0.0700	0.07006	10.0	1.002545	0.7	0.00989	10.0	14.309	20.4
u	ln gd u	$\omega F_u'$	sec gd u	$\omega F_u'$	sin gd u	$\omega F_u'$	cos gd u	$\omega F_u'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0700	0.07005	10,0	1.00215	0,7	0.06889	10,0	1.4300	20,4
.0701	.07016		.00216		.06899		1.4330	20,4
.0702	.07026		.00217		.07008		1.4368	20,4
.0703	.07036		.00217		.07018		1.4398	20,2
.0704	.07046		.00218		.07028		1.4428	20,1
0.0705	0.07056	10,0	1.00219	0,7	0.07038	10,0	1.4458	20,1
.0706	.07066		.00219		.07048		1.4488	20,0
.0707	.07076		.00250		.07058		1.4518	20,0
.0708	.07086		.00251		.07068		1.4548	19,9
.0709	.07096		.00251		.07078	9,9	1.4578	19,9
0.0710	0.07106	10,0	1.00252	0,7	0.07088	9,9	1.4608	19,8
.0711	.07116		.00253		.07098		1.4638	19,7
.0712	.07126		.00254		.07108		1.4669	19,7
.0713	.07136		.00254		.07118		1.4699	19,6
.0714	.07146		.00255		.07128		1.4729	19,6
0.0715	0.07156	10,0	1.00256	0,7	0.07138	9,9	1.4760	19,5
.0716	.07166		.00256		.07148		1.4790	19,5
.0717	.07176		.00257		.07158		1.4821	19,4
.0718	.07186		.00258		.07168		1.4852	19,4
.0719	.07196		.00259		.07178		1.4883	19,3
0.0720	0.07206	10,0	1.00259	0,7	0.07188	9,9	1.4914	19,3
.0721	.07216		.00260		.07198		1.4944	19,3
.0722	.07226		.00261		.07207		1.4974	19,2
.0723	.07236		.00261		.07217		1.5005	19,1
.0724	.07246		.00262		.07227		1.5036	19,0
0.0725	0.07256	10,0	1.00263	0,7	0.07237	9,9	1.5067	19,0
.0726	.07266		.00264		.07247		1.5098	18,9
.0727	.07276		.00264		.07257		1.5129	18,9
.0728	.07286		.00265		.07267		1.5160	18,8
.0729	.07296		.00266		.07277		1.5191	18,8
0.0730	0.07306	10,0	1.00267	0,7	0.07287	9,9	1.5222	18,7
.0731	.07317		.00267		.07297		1.5253	18,7
.0732	.07327		.00268		.07307		1.5284	18,6
.0733	.07337		.00269		.07317		1.5315	18,6
.0734	.07347		.00269		.07327		1.5346	18,5
0.0735	0.07357	10,0	1.00270	0,7	0.07337	9,9	1.5377	18,5
.0736	.07367		.00271		.07347		1.5408	18,4
.0737	.07377		.00272		.07357		1.5439	18,4
.0738	.07387		.00272		.07367		1.5470	18,3
.0739	.07397		.00273		.07377		1.5501	18,3
0.0740	0.07407	10,0	1.00274	0,7	0.07387	9,9	1.5532	18,2
.0741	.07417		.00275		.07397		1.5563	18,2
.0742	.07427		.00275		.07406		1.5594	18,1
.0743	.07437		.00276		.07416		1.5625	18,1
.0744	.07447		.00277		.07426		1.5656	18,0
0.0745	0.07457	10,0	1.00278	0,7	0.07436	9,9	1.5687	18,0
.0746	.07467		.00278		.07446		1.5718	17,9
.0747	.07477		.00279		.07456		1.5749	17,9
.0748	.07487		.00280		.07466		1.5780	17,8
.0749	.07497		.00281		.07476		1.5811	17,8
0.0750	0.07507	10,0	1.00281	0,8	0.07486	9,9	1.5842	17,7
u	tanh u	$\omega F_0'$	coth u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0750	0.07507	10.0	1.00281	0.8	0.07486	9.9	13.358	17.7
.0751	.07517		.00282		.07496		13.341	17.7
.0752	.07527		.00283		.07506		13.323	17.7
.0753	.07537		.00284		.07516		13.305	17.6
.0754	.07547		.00284		.07526		13.288	17.6
0.0755	0.07557	10.0	1.00285	0.8	0.07536	9.9	13.270	17.5
.0756	.07567		.00286		.07546		13.253	17.5
.0757	.07577		.00287		.07556		13.235	17.4
.0758	.07587		.00287		.07566		13.218	17.4
.0759	.07597		.00288		.07575		13.201	17.3
0.0760	0.07607	10.0	1.00289	0.8	0.07585	9.9	13.183	17.3
.0761	.07617		.00290		.07595		13.166	17.2
.0762	.07627		.00290		.07605		13.149	17.2
.0763	.07637		.00291		.07615		13.132	17.1
.0764	.07647		.00292		.07625		13.114	17.1
0.0765	0.07657	10.0	1.00293	0.8	0.07635	9.9	13.097	17.1
.0766	.07667		.00294		.07645		13.080	17.0
.0767	.07678		.00294		.07655		13.063	17.0
.0768	.07688		.00295		.07665		13.046	16.9
.0769	.07698		.00295		.07675		13.030	16.9
0.0770	0.07708	10.0	1.00297	0.8	0.07685	9.9	13.013	16.8
.0771	.07718		.00297		.07695		12.996	16.8
.0772	.07728		.00298		.07705		12.979	16.7
.0773	.07738		.00299		.07715		12.962	16.7
.0774	.07748		.00300		.07725		12.946	16.7
0.0775	0.07758	10.0	1.00300	0.8	0.07735	9.9	12.929	16.6
.0776	.07768		.00301		.07744		12.912	16.6
.0777	.07778		.00302		.07754		12.896	16.5
.0778	.07788		.00303		.07764		12.879	16.5
.0779	.07798		.00304		.07774		12.863	16.5
0.0780	0.07808	10.0	1.00304	0.8	0.07784	9.9	12.847	16.4
.0781	.07818		.00305		.07794		12.830	16.4
.0782	.07828		.00306		.07804		12.814	16.3
.0783	.07838		.00307		.07814		12.797	16.3
.0784	.07848		.00307		.07824		12.781	16.2
0.0785	0.07858	10.0	1.00308	0.8	0.07834	9.9	12.765	16.2
.0786	.07868		.00309		.07844		12.749	16.2
.0787	.07878		.00310		.07854		12.733	16.1
.0788	.07888		.00311		.07864		12.717	16.1
.0789	.07898		.00311		.07874		12.701	16.0
0.0790	0.07908	10.0	1.00312	0.8	0.07884	9.9	12.685	16.0
.0791	.07918		.00313		.07894		12.669	15.9
.0792	.07928		.00314		.07903		12.653	15.9
.0793	.07938		.00315		.07913		12.637	15.9
.0794	.07948		.00315		.07923		12.621	15.8
0.0795	0.07958	10.0	1.00316	0.8	0.07933	9.9	12.605	15.8
.0796	.07968		.00317		.07943		12.589	15.7
.0797	.07978		.00318		.07953		12.574	15.7
.0798	.07988		.00319		.07963		12.558	15.7
.0799	.07999		.00319		.07973		12.542	15.6
0.0800	0.08009	10.0	1.00320	0.8	0.07983	9.9	12.527	15.6
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$



# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$
0.0800	0.08009	10.0	1.00320	0.8	0.07983	9.9	12.557	15.6
.0801	.08019		.00321		.07993		12.551	15.6
.0802	.08029		.00322		.08003		12.545	15.5
.0803	.08039		.00323		.08013		12.539	15.5
.0804	.08049		.00323		.08023		12.535	15.4
0.0805	0.08059	10.0	1.00324	0.8	0.08033	9.9	12.540	15.4
.0806	.08069		.00325		.08043		12.534	15.4
.0807	.08079		.00326		.08053		12.528	15.3
.0808	.08089		.00327		.08062		12.523	15.3
.0809	.08099		.00327		.08072		12.518	15.2
0.0810	0.08109	10.0	1.00328	0.8	0.08082	9.9	12.523	15.2
.0811	.08119		.00329		.08092		12.517	15.2
.0812	.08129		.00330		.08102		12.512	15.1
.0813	.08139		.00331		.08112		12.507	15.1
.0814	.08149		.00331		.08122		12.502	15.1
0.0815	0.08159	10.0	1.00332	0.8	0.08132	9.9	12.507	15.0
.0816	.08169		.00333		.08142		12.502	15.0
.0817	.08179		.00334		.08152		12.497	14.9
.0818	.08189		.00335		.08162		12.492	14.9
.0819	.08199		.00336		.08172		12.487	14.9
0.0820	0.08209	10.0	1.00336	0.8	0.08182	9.9	12.492	14.8
.0821	.08219		.00337		.08192		12.487	14.8
.0822	.08229		.00338		.08202		12.482	14.8
.0823	.08239		.00339		.08212		12.477	14.7
.0824	.08249		.00340		.08222		12.472	14.7
0.0825	0.08259	10.0	1.00341	0.8	0.08232	9.9	12.477	14.7
.0826	.08269		.00341		.08242		12.472	14.6
.0827	.08279		.00342		.08252		12.467	14.6
.0828	.08289		.00343		.08262		12.462	14.6
.0829	.08299		.00344		.08272		12.457	14.5
0.0830	0.08310	10.0	1.00345	0.8	0.08282	9.9	12.462	14.5
.0831	.08320		.00345		.08292		12.457	14.5
.0832	.08330		.00346		.08302		12.452	14.4
.0833	.08340		.00347		.08312		12.447	14.4
.0834	.08350		.00348		.08322		12.442	14.4
0.0835	0.08360	10.0	1.00349	0.8	0.08332	9.9	12.447	14.3
.0836	.08370		.00350		.08342		12.442	14.3
.0837	.08380		.00350		.08352		12.437	14.3
.0838	.08390		.00351		.08362		12.432	14.2
.0839	.08400		.00352		.08372		12.427	14.2
0.0840	0.08410	10.0	1.00353	0.8	0.08382	9.9	12.432	14.1
.0841	.08420		.00354		.08392		12.427	14.1
.0842	.08430		.00355		.08402		12.422	14.1
.0843	.08440		.00356		.08412		12.417	14.0
.0844	.08450		.00356		.08422		12.412	14.0
0.0845	0.08460	10.0	1.00357	0.8	0.08432	9.9	12.417	14.0
.0846	.08470		.00358		.08442		12.412	13.9
.0847	.08480		.00359		.08452		12.407	13.9
.0848	.08490		.00360		.08462		12.402	13.9
.0849	.08500		.00361	0.9	.08472		12.397	13.8
0.0850	0.08510	10.0	1.00361	0.9	0.08482	9.9	12.402	13.8
$u$	$\tanh u$	$\omega F_u'$	$\operatorname{sech} u$	$\omega F_u'$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$

SMITHSONIAN TABLES

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0850	0.08510	10.0	1.00361	0.9	0.08480	9.9	11.793	13.8
.0851	.08520		.00362		.08490		11.779	13.8
.0852	.08530		.00363		.08499		11.765	13.7
.0853	.08540		.00364		.08509		11.752	13.7
.0854	.08550		.00365		.08519		11.738	13.7
0.0855	0.08560	10.0	1.00366	0.9	0.08529	9.9	11.724	13.6
.0856	.08570		.00367		.08539		11.711	13.6
.0857	.08580		.00367		.08549		11.697	13.6
.0858	.08591		.00368		.08559		11.684	13.6
.0859	.08601		.00369		.08569		11.670	13.5
0.0860	0.08611	10.0	1.00370	0.9	0.08579	9.9	11.657	13.5
.0861	.08621		.00371		.08589		11.643	13.5
.0862	.08631		.00372		.08599		11.630	13.4
.0863	.08641		.00373		.08609		11.616	13.4
.0864	.08651		.00373		.08619		11.603	13.4
0.0865	0.08661	10.0	1.00374	0.9	0.08628	9.9	11.590	13.3
.0866	.08671		.00375		.08638		11.576	13.3
.0867	.08681		.00376		.08648		11.563	13.3
.0868	.08691		.00377		.08658		11.550	13.2
.0869	.08701		.00378		.08668		11.536	13.2
0.0870	0.08711	10.0	1.00379	0.9	0.08678	9.9	11.523	13.2
.0871	.08721		.00380		.08688		11.510	13.1
.0872	.08731		.00380		.08698		11.497	13.1
.0873	.08741		.00381		.08708		11.484	13.1
.0874	.08751		.00382		.08718		11.471	13.1
0.0875	0.08761	10.0	1.00383	0.9	0.08728	9.9	11.458	13.0
.0876	.08771		.00384		.08738		11.445	13.0
.0877	.08781		.00385		.08748		11.432	13.0
.0878	.08791		.00385		.08758		11.419	12.9
.0879	.08801		.00387		.08767		11.406	12.9
0.0880	0.08811	10.0	1.00387	0.9	0.08777	9.9	11.393	12.9
.0881	.08821		.00388		.08787		11.380	12.8
.0882	.08831		.00389		.08797		11.367	12.8
.0883	.08841		.00390		.08807		11.354	12.8
.0884	.08852		.00391		.08817		11.342	12.8
0.0885	0.08862	10.0	1.00392	0.9	0.08827	9.9	11.329	12.7
.0886	.08872		.00393		.08837		11.316	12.7
.0887	.08882		.00394		.08847		11.304	12.7
.0888	.08892		.00395		.08857		11.291	12.6
.0889	.08902		.00395		.08867		11.278	12.6
0.0890	0.08912	10.0	1.00396	0.9	0.08877	9.9	11.266	12.6
.0891	.08922		.00397		.08886		11.253	12.6
.0892	.08932		.00398		.08896		11.240	12.5
.0893	.08942		.00399		.08906		11.228	12.5
.0894	.08952		.00400		.08916		11.215	12.5
0.0895	0.08962	10.0	1.00401	0.9	0.08926	9.9	11.203	12.5
.0896	.08972		.00402		.08936		11.191	12.4
.0897	.08982		.00403		.08946		11.178	12.4
.0898	.08992		.00403		.08956		11.166	12.4
.0899	.09002		.00404		.08966		11.153	12.3
0.0900	0.09012	10.0	1.00405	0.9	0.08976	9.9	11.141	12.3
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
0.0900	0.09012	10.0	1.00105	0.9	0.08976	9.9	11.141	15.3
.0901	.09022		.00106		.08986		11.139	15.3
.0902	.09032		.00107		.08996		11.117	15.3
.0903	.09042		.00108		.09006		11.104	15.3
.0904	.09052		.00109		.09015		11.092	15.3
0.0905	0.09062	10.0	1.00110	0.9	0.09025	9.9	11.080	15.3
.0906	.09072		.00111		.09035		11.068	15.1
.0907	.09082		.00112		.09045		11.056	15.1
.0908	.09092		.00113		.09055		11.043	15.1
.0909	.09103		.00113		.09065		11.031	15.1
0.0910	0.09113	10.0	1.00114	0.9	0.09075	9.9	11.019	15.0
.0911	.09123		.00115		.09085		11.007	15.0
.0912	.09133		.00116		.09095		10.995	15.0
.0913	.09143		.00117		.09105		10.983	15.0
.0914	.09153		.00118		.09115		10.971	11.9
0.0915	0.09163	10.0	1.00119	0.9	0.09125	9.9	10.959	11.9
.0916	.09173		.00120		.09134		10.948	11.9
.0917	.09183		.00121		.09144		10.936	11.9
.0918	.09193		.00122		.09154		10.924	11.8
.0919	.09203		.00123		.09164		10.912	11.8
0.0920	0.09213	10.0	1.00123	0.9	0.09174	9.9	10.900	11.8
.0921	.09223		.00124		.09184		10.888	11.8
.0922	.09233		.00125		.09194		10.877	11.7
.0923	.09243		.00126		.09204		10.865	11.7
.0924	.09253		.00127		.09214		10.853	11.7
0.0925	0.09263	10.0	1.00128	0.9	0.09224	9.9	10.842	11.7
.0926	.09273		.00129		.09234		10.830	11.6
.0927	.09283		.00130		.09244		10.818	11.6
.0928	.09293		.00131		.09253		10.807	11.6
.0929	.09303		.00132		.09263		10.795	11.6
0.0930	0.09313	10.0	1.00133	0.9	0.09273	9.9	10.784	11.5
.0931	.09323		.00134		.09283		10.772	11.5
.0932	.09333		.00135		.09293		10.761	11.5
.0933	.09344		.00136		.09303		10.749	11.5
.0934	.09354		.00136		.09313		10.738	11.4
0.0935	0.09364	10.0	1.00137	0.9	0.09323	9.9	10.726	11.4
.0936	.09374		.00138		.09333		10.715	11.4
.0937	.09384		.00139		.09343		10.704	11.4
.0938	.09394		.00140		.09353		10.692	11.3
.0939	.09404		.00141		.09362		10.681	11.3
0.0940	0.09414	10.0	1.00142	0.9	0.09372	9.9	10.670	11.3
.0941	.09424		.00143		.09382		10.658	11.3
.0942	.09434		.00144		.09392		10.647	11.3
.0943	.09444		.00145		.09402		10.636	11.2
.0944	.09454		.00146		.09412		10.625	11.2
0.0945	0.09464	10.0	1.00147	0.9	0.09422	9.9	10.613	11.2
.0946	.09474		.00148		.09432		10.602	11.1
.0947	.09484		.00149		.09442		10.591	11.1
.0948	.09494		.00150	0.9	.09452		10.580	11.1
.0949	.09504		.00151	1.0	.09462		10.569	11.1
0.0950	0.09514	10.0	1.00152	1.0	0.09472	9.9	10.558	11.0
$u$	$\tan pd u$	$\omega F_0'$	$\sec pd u$	$\omega F_0'$	$\sin pd u$	$\omega F_0'$	$\csc pd u$	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.0950	0.09514	10,0	1.00152	1,0	0.09172	9,9	10.558	11,0
.0951	.09524		.00153		.09181		10.547	11,0
.0952	.09534		.00153		.09191		10.536	11,0
.0953	.09544		.00154		.09501		10.525	11,0
.0954	.09554		.00155		.09511		10.514	11,0
0.0955	0.09565	10,0	1.00156	1,0	0.09521	9,9	10.503	10,9
.0956	.09575		.00157		.09531		10.492	10,9
.0957	.09585		.00158		.09541		10.481	10,9
.0958	.09595		.00159		.09551		10.470	10,9
.0959	.09605		.00160		.09561		10.459	10,8
0.0960	0.09615	10,0	1.00161	1,0	0.09571	9,9	10.449	10,8
.0961	.09625		.00162		.09581		10.438	10,8
.0962	.09635		.00163		.09590		10.427	10,8
.0963	.09645		.00164		.09600		10.416	10,7
.0964	.09655		.00165		.09610		10.406	10,7
0.0965	0.09665	10,0	1.00166	1,0	0.09620	9,9	10.395	10,7
.0966	.09675		.00167		.09630		10.384	10,7
.0967	.09685		.00168		.09640		10.373	10,7
.0968	.09695		.00169		.09650		10.363	10,6
.0969	.09705		.00170		.09660		10.352	10,6
0.0970	0.09715	10,0	1.00171	1,0	0.09670	9,9	10.342	10,6
.0971	.09725		.00172		.09680		10.331	10,6
.0972	.09735		.00173		.09689		10.320	10,6
.0973	.09745		.00174		.09699		10.310	10,5
.0974	.09755		.00175		.09709		10.299	10,5
0.0975	0.09765	10,0	1.00176	1,0	0.09719	9,9	10.289	10,5
.0976	.09775		.00177		.09729		10.278	10,5
.0977	.09785		.00178		.09739		10.268	10,4
.0978	.09795		.00179		.09749		10.258	10,4
.0979	.09806		.00180		.09759		10.247	10,4
0.0980	0.09816	10,0	1.00181	1,0	0.09769	9,9	10.237	10,4
.0981	.09826		.00182		.09779		10.226	10,4
.0982	.09836		.00183		.09788		10.216	10,3
.0983	.09846		.00184		.09798		10.206	10,3
.0984	.09856		.00185		.09808		10.195	10,3
0.0985	0.09866	10,0	1.00186	1,0	0.09818	9,9	10.185	10,3
.0986	.09876		.00186		.09828		10.175	10,3
.0987	.09886		.00187		.09838		10.165	10,2
.0988	.09896		.00188		.09848		10.154	10,2
.0989	.09906		.00189		.09858		10.144	10,2
0.0990	0.09916	10,0	1.00190	1,0	0.09868	9,9	10.134	10,2
.0991	.09926		.00191		.09878		10.124	10,1
.0992	.09936		.00192		.09888		10.114	10,1
.0993	.09946		.00193		.09897		10.104	10,1
.0994	.09956		.00194		.09907		10.093	10,1
0.0995	0.09966	10,0	1.00195	1,0	0.09917	9,9	10.083	10,1
.0996	.09976		.00196		.09927		10.073	10,0
.0997	.09987		.00197		.09937		10.063	10,0
.0998	.09997		.00198		.09947		10.053	10,0
.0999	.10007		.00199		.09957		10.043	10,0
0.1000	0.10017	10,1	1.00500	1,0	0.09967	9,9	10.033	10,0
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$
0.100	0.10017	100.5	1.00500	10.0	0.09987	99.0	10.0333	99.47
.101	.10117	100.5	.00510	10.1	.00605	99.0	9.9333	977.0
.102	.10218	100.5	.00521	10.2	.01016	99.0	.8370	957.0
.103	.10318	100.5	.00531	10.3	.02041	98.9	.7430	930.3
.104	.10419	100.5	.00541	10.4	.03613	98.9	.6500	904.1
0.105	0.10519	100.6	1.00552	10.5	0.10462	98.9	0.5583	878.7
.106	.10620	100.6	.00562	10.6	.01980	98.9	.4693	853.7
.107	.10720	100.6	.00573	10.7	.03689	98.9	.3814	829.1
.108	.10821	100.6	.00584	10.8	.05558	98.8	.3052	805.0
.109	.10922	100.6	.00595	10.9	.07857	98.8	.2400	781.4
0.110	0.11022	100.6	1.00605	11.0	0.10950	98.8	0.1873	758.1
.111	.11123	100.6	.00617	11.1	.01955	98.8	.1600	735.3
.112	.11223	100.6	.00628	11.2	.03453	98.8	.1360	713.0
.113	.11324	100.6	.00639	11.3	.05252	98.7	.1152	691.3
.114	.11425	100.7	.00651	11.4	.07351	98.7	.1000	670.1
0.115	0.11525	100.7	1.00662	11.5	0.11450	98.7	8.7310	754.8
.116	.11626	100.7	.00672	11.6	.01958	98.7	.0593	730.8
.117	.11727	100.7	.00685	11.7	.03647	98.6	.5800	707.2
.118	.11827	100.7	.00697	11.8	.05540	98.6	.5130	684.6
.119	.11928	100.7	.00709	11.9	.07641	98.6	.4430	662.8
0.120	0.12029	100.7	1.00721	12.0	0.11943	98.6	8.3733	691.1
.121	.12130	100.7	.00733	12.1	.01941	98.6	.3048	670.2
.122	.12230	100.7	.00745	12.2	.03440	98.5	.5473	648.5
.123	.12331	100.8	.00757	12.3	.05338	98.5	.4710	627.7
.124	.12432	100.8	.00770	12.4	.07437	98.5	.4058	607.0
0.125	0.12533	100.8	1.00782	12.5	0.12445	98.5	8.0116	636.2
.126	.12633	100.8	.00795	12.6	.01951	98.4	.7098	620.6
.127	.12734	100.8	.00808	12.7	.03642	98.4	.6161	605.2
.128	.12835	100.8	.00820	12.8	.05531	98.4	.5551	590.7
.129	.12936	100.8	.00833	12.9	.07630	98.4	.4910	577.6
0.130	0.13037	100.8	1.00846	13.0	0.12947	98.3	7.7386	588.1
.131	.13138	100.9	.00859	13.1	.01956	98.3	.6272	570.4
.132	.13238	100.9	.00872	13.2	.03644	98.3	.6102	557.0
.133	.13339	100.9	.00886	13.3	.05533	98.3	.5631	545.0
.134	.13440	100.9	.00899	13.4	.07632	98.3	.5073	533.6
0.135	0.13541	100.9	1.00913	13.5	0.13440	98.2	7.4524	545.0
.136	.13642	100.9	.00926	13.6	.01957	98.2	.6082	532.3
.137	.13743	100.9	.00940	13.7	.03645	98.1	.6110	520.5
.138	.13844	101.0	.00954	13.8	.05534	98.1	.5953	511.8
.139	.13945	101.0	.00968	13.9	.07633	98.1	.5405	504.3
0.140	0.14046	101.0	1.00982	14.0	0.13950	98.1	7.1805	506.0
.141	.14147	101.0	.00995	14.1	.01960	98.0	.6101	496.7
.142	.14248	101.0	.01010	14.2	.03646	98.0	.6095	492.6
.143	.14349	101.0	.01024	14.3	.05535	98.0	.6100	488.7
.144	.14450	101.0	.01039	14.4	.07634	98.0	.6092	478.9
0.145	0.14551	101.1	1.01053	14.5	0.14370	97.9	6.9148	472.3
.146	.14652	101.1	.01068	14.6	.01967	97.9	.6079	465.8
.147	.14753	101.1	.01082	14.7	.03647	97.9	.6072	459.5
.148	.14854	101.1	.01097	14.8	.05536	97.8	.6060	453.2
.149	.14955	101.1	.01112	15.0	.07635	97.8	.6050	447.1
0.150	0.15056	101.1	1.01127	15.1	0.14889	97.8	6.7166	441.1
$u$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	c: $F_0'$
0.150	0.15056	101.1	1.01127	15.1	0.14889	97.8	6.7166	441.1
.151	.15157	101.1	.01142	15.2	.14985	97.8	.6728	435.3
.152	.15259	101.2	.01157	15.3	.15081	97.7	.6295	429.5
.153	.15360	101.2	.01173	15.4	.15182	97.7	.5860	423.9
.154	.15461	101.2	.01188	15.5	.15279	97.7	.5448	418.3
0.155	0.15562	101.2	1.01204	15.6	0.15377	97.6	6.5032	412.9
.156	.15663	101.2	.01219	15.7	.15475	97.6	.4622	407.6
.157	.15765	101.2	.01235	15.8	.15572	97.6	.4217	402.4
.158	.15866	101.3	.01251	15.9	.15670	97.5	.3817	397.3
.159	.15967	101.3	.01267	16.0	.15767	97.5	.3422	392.2
0.160	0.16068	101.3	1.01283	16.1	0.15865	97.5	6.3032	387.3
.161	.16170	101.3	.01299	16.2	.15962	97.5	.2648	382.5
.162	.16271	101.3	.01315	16.3	.16060	97.4	.2267	377.7
.163	.16372	101.3	.01331	16.4	.16157	97.4	.1892	373.1
.164	.16474	101.3	.01348	16.5	.16254	97.4	.1521	368.5
0.165	0.16575	101.4	1.01361	16.6	0.16352	97.3	6.1155	364.0
.166	.16676	101.4	.01381	16.7	.16449	97.3	.0793	359.6
.167	.16778	101.4	.01398	16.8	.16546	97.3	.0436	355.2
.168	.16879	101.4	.01415	16.9	.16644	97.2	.0083	351.0
.169	.16981	101.4	.01431	17.0	.16741	97.2	5.9734	346.8
0.170	0.17082	101.4	1.01448	17.1	0.16838	97.2	5.9389	342.7
.171	.17183	101.5	.01466	17.2	.16935	97.1	.9048	338.7
.172	.17285	101.5	.01483	17.3	.17032	97.1	.8712	334.7
.173	.17386	101.5	.01500	17.4	.17129	97.1	.8379	330.8
.174	.17488	101.5	.01518	17.5	.17226	97.0	.8050	327.0
0.175	0.17589	101.5	1.01535	17.6	0.17324	97.0	5.7725	323.2
.176	.17691	101.6	.01553	17.7	.17420	97.0	.7404	319.5
.177	.17793	101.6	.01571	17.8	.17517	96.9	.7085	315.9
.178	.17894	101.6	.01588	17.9	.17614	96.9	.6767	312.3
.179	.17996	101.6	.01606	18.0	.17711	96.9	.6461	308.8
0.180	0.18097	101.6	1.01624	18.1	0.17808	96.8	5.6154	305.3
.181	.18199	101.6	.01643	18.2	.17905	96.8	.5851	301.9
.182	.18301	101.7	.01661	18.3	.18002	96.8	.5550	298.6
.183	.18402	101.7	.01679	18.4	.18098	96.7	.5253	295.3
.184	.18504	101.7	.01698	18.5	.18195	96.7	.4960	292.1
0.185	0.18606	101.7	1.01716	18.6	0.18292	96.7	5.4659	288.9
.186	.18707	101.7	.01735	18.7	.18388	96.6	.4382	285.8
.187	.18809	101.8	.01754	18.8	.18485	96.6	.4098	282.7
.188	.18911	101.8	.01772	18.9	.18582	96.5	.3817	279.6
.189	.19013	101.8	.01791	19.0	.18678	96.5	.3539	276.6
0.190	0.19115	101.8	1.01810	19.1	0.18775	96.5	5.3263	273.7
.191	.19216	101.8	.01830	19.2	.18871	96.4	.2991	270.8
.192	.19318	101.8	.01849	19.3	.18967	96.4	.2722	268.0
.193	.19420	101.9	.01868	19.4	.19064	96.4	.2455	265.2
.194	.19522	101.9	.01888	19.5	.19160	96.3	.2191	262.4
0.195	0.19624	101.9	1.01907	19.6	0.19257	96.3	5.1930	259.7
.196	.19725	101.9	.01927	19.7	.19353	96.3	.1672	257.0
.197	.19828	102.0	.01947	19.8	.19449	96.2	.1416	254.4
.198	.19930	102.0	.01967	19.9	.19545	96.2	.1163	251.8
.199	.20032	102.0	.01987	20.0	.19641	96.1	.0913	249.2
0.200	0.20134	102.0	1.02007	20.1	0.19738	96.1	5.0665	246.7
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	lnh u	$\omega F_0'$	coth u	$\omega F_0'$
0.200	0.20131	102,0	1.02007	20,1	0.19733	96,1	5.0005	246,7
.201	.20236	102,0	.02027	20,2	.10834	96,1	.0110	244,2
.202	.20338	102,0	.02047	20,3	.10930	96,0	.0120	241,8
.203	.20440	102,1	.02068	20,4	.20035	96,0	4.0930	239,4
.204	.20542	102,1	.02088	20,5	.20122	96,0	.0938	237,0
0.205	0.20644	102,1	1.02109	20,6	0.20218	95,9	4.9462	234,6
.206	.20746	102,1	.02129	20,7	.20314	95,9	.0238	232,3
.207	.20848	102,2	.02150	20,8	.20400	95,8	.8097	230,1
.208	.20950	102,2	.02171	21,0	.20505	95,8	.8763	227,8
.209	.21052	102,2	.02192	21,1	.20601	95,8	.8542	225,6
0.210	0.21155	102,2	1.02213	21,2	0.20697	95,7	4.8317	223,5
.211	.21257	102,2	.02234	21,3	.20792	95,7	.8005	221,3
.212	.21359	102,3	.02256	21,4	.20888	95,6	.7874	219,2
.213	.21461	102,3	.02277	21,5	.20984	95,6	.7656	217,1
.214	.21564	102,3	.02299	21,6	.21079	95,6	.7440	215,1
0.215	0.21666	102,3	1.02320	21,7	0.21175	95,5	4.7226	213,0
.216	.21768	102,3	.02342	21,8	.21270	95,5	.7011	211,0
.217	.21871	102,4	.02364	21,9	.21366	95,4	.6801	209,1
.218	.21973	102,4	.02385	22,0	.21461	95,4	.6595	207,1
.219	.22075	102,4	.02408	22,1	.21556	95,4	.6390	205,2
0.220	0.22178	102,4	1.02430	22,2	0.21652	95,3	4.6186	203,3
.221	.22280	102,5	.02452	22,3	.21747	95,3	.5983	201,4
.222	.22383	102,5	.02474	22,4	.21843	95,2	.5783	199,6
.223	.22485	102,5	.02497	22,5	.21938	95,2	.5581	197,8
.224	.22588	102,5	.02519	22,6	.22033	95,1	.5387	196,0
0.225	0.22690	102,5	1.02542	22,7	0.22128	95,1	4.5192	194,2
.226	.22793	102,6	.02565	22,8	.22223	95,1	.5199	192,5
.227	.22895	102,6	.02588	22,9	.22318	95,0	.4907	190,8
.228	.22998	102,6	.02610	23,0	.22413	95,0	.4617	189,1
.229	.23101	102,6	.02634	23,1	.22508	94,9	.4429	187,4
0.230	0.23203	102,7	1.02657	23,2	0.22603	94,9	4.4242	185,7
.231	.23306	102,7	.02680	23,3	.22698	94,8	.4032	184,1
.232	.23409	102,7	.02703	23,4	.22793	94,8	.3821	182,5
.233	.23511	102,7	.02727	23,5	.22887	94,8	.3602	180,9
.234	.23614	102,8	.02750	23,6	.22982	94,7	.3384	179,3
0.235	0.23717	102,8	1.02774	23,7	0.23077	94,7	4.3334	177,8
.236	.23820	102,8	.02798	23,8	.23171	94,6	.3157	176,2
.237	.23922	102,8	.02822	23,9	.23266	94,6	.2981	174,7
.238	.24025	102,8	.02846	24,0	.23361	94,5	.2807	173,2
.239	.24128	102,9	.02870	24,1	.23455	94,5	.2635	171,8
0.240	0.24231	102,9	1.02894	24,2	0.23550	94,5	4.2461	170,3
.241	.24334	102,9	.02918	24,3	.23644	94,4	.2491	168,9
.242	.24437	102,9	.02943	24,4	.23738	94,4	.2320	167,5
.243	.24540	103,0	.02967	24,5	.23833	94,3	.2159	166,1
.244	.24643	103,0	.02992	24,6	.23927	94,3	.1991	164,7
0.245	0.24746	103,0	1.03016	24,7	0.24021	94,2	4.1630	163,3
.246	.24849	103,0	.03041	24,8	.24115	94,2	.1867	162,0
.247	.24952	103,1	.03066	25,0	.24210	94,1	.1706	160,6
.248	.25055	103,1	.03091	25,1	.24304	94,1	.1546	159,3
.249	.25158	103,1	.03116	25,2	.24398	94,0	.1387	158,0
0.250	0.25261	103,1	1.03141	25,3	0.24492	94,0	4.0830	156,7
u	tan pd u	$\omega F_0'$	sec pd u	$\omega F_0'$	sin pd u	$\omega F_0'$	csc pd u	$\omega F_0'$





# Natural Hyperbolic Functions.

u	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
0.300	0.30152	104.5	1.04534	30.5	0.29131	91.5	3.4327	107.8
.301	.30557	104.6	.04504	30.6	.29223	91.5	.4220	107.1
.302	.30661	104.6	.04595	30.7	.29311	91.4	.4113	106.4
.303	.30766	104.6	.04626	30.8	.29406	91.4	.4007	105.6
.304	.30870	104.7	.04656	30.9	.29497	91.3	.3902	104.9
0.305	0.30975	104.7	1.04687	31.0	0.29588	91.2	3.3797	104.2
.306	.31080	104.7	.04718	31.1	.29679	91.2	.3693	103.5
.307	.31185	104.7	.04750	31.2	.29771	91.1	.3590	102.8
.308	.31289	104.8	.04781	31.3	.29862	91.1	.3488	102.1
.309	.31394	104.8	.04812	31.4	.29953	91.0	.3386	101.5
0.310	0.31499	104.8	1.04844	31.5	0.30044	91.0	3.3285	100.8
.311	.31604	104.9	.04875	31.6	.30135	90.9	.3184	100.1
.312	.31709	104.9	.04907	31.7	.30226	90.9	.3085	99.5
.313	.31814	104.9	.04939	31.8	.30316	90.8	.2985	98.8
.314	.31919	105.0	.04970	31.9	.30407	90.8	.2887	98.2
0.315	0.32024	105.0	1.05002	32.0	0.30498	90.7	3.2780	97.5
.316	.32129	105.0	.05034	32.1	.30589	90.6	.2692	96.9
.317	.32234	105.1	.05067	32.2	.30679	90.6	.2595	96.2
.318	.32339	105.1	.05099	32.3	.30770	90.5	.2499	95.6
.319	.32444	105.1	.05131	32.4	.30860	90.5	.2401	95.0
0.320	0.32549	105.2	1.05164	32.5	0.30951	90.4	3.2309	94.4
.321	.32654	105.2	.05196	32.7	.31041	90.4	.2315	93.8
.322	.32759	105.2	.05229	32.8	.31131	90.3	.2222	93.2
.323	.32865	105.3	.05262	32.9	.31222	90.3	.2129	92.6
.324	.32970	105.3	.05295	33.0	.31312	90.2	.2037	92.0
0.325	0.33075	105.3	1.05328	33.1	0.31402	90.1	3.1845	91.4
.326	.33181	105.4	.05361	33.2	.31492	90.1	.1751	90.8
.327	.33286	105.4	.05394	33.3	.31582	90.0	.1661	90.3
.328	.33391	105.4	.05428	33.4	.31672	90.0	.1573	89.7
.329	.33497	105.5	.05461	33.5	.31762	89.9	.1484	89.1
0.330	0.33602	105.5	1.05495	33.6	0.31852	89.9	3.1395	88.6
.331	.33708	105.5	.05528	33.7	.31942	89.8	.1307	88.0
.332	.33813	105.6	.05562	33.8	.32032	89.7	.1219	87.5
.333	.33919	105.6	.05596	33.9	.32121	89.7	.1132	86.9
.334	.34024	105.6	.05630	34.0	.32211	89.6	.1045	86.4
0.335	0.34130	105.7	1.05664	34.1	0.32301	89.6	3.0959	85.8
.336	.34236	105.7	.05698	34.2	.32390	89.5	.0874	85.3
.337	.34342	105.7	.05732	34.3	.32480	89.5	.0789	84.8
.338	.34447	105.8	.05767	34.4	.32569	89.4	.0704	84.3
.339	.34553	105.8	.05801	34.6	.32658	89.3	.0620	83.8
0.340	0.34659	105.8	1.05836	34.7	0.32748	89.3	3.0536	83.2
.341	.34765	105.9	.05871	34.8	.32837	89.2	.0453	82.7
.342	.34871	105.9	.05905	34.9	.32926	89.2	.0371	82.2
.343	.34977	105.9	.05940	35.0	.33015	89.1	.0289	81.7
.344	.35082	106.0	.05975	35.1	.33104	89.0	.0207	81.2
0.345	0.35188	106.0	1.06011	35.2	0.33193	89.0	3.0126	80.8
.346	.35295	106.0	.06046	35.3	.33282	88.9	.0046	80.3
.347	.35401	106.1	.06081	35.4	.33371	88.9	.2.9906	79.8
.348	.35507	106.1	.06117	35.5	.33460	88.8	.0886	79.3
.349	.35613	106.2	.06152	35.6	.33549	88.7	.0807	78.8
0.350	0.35719	106.2	1.06188	35.7	0.33638	88.7	2.9729	78.4
u	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.350	0.35719	106,2	1.06188	35,7	0.33638	88,7	2.9729	78,4
.351	.35825	106,2	.06224	35,8	.33726	88,6	.9651	77,9
.352	.35931	106,3	.06259	35,9	.33815	88,6	.9573	77,5
.353	.36038	106,3	.06295	36,0	.33903	88,5	.9496	77,0
.354	.36144	106,3	.06332	36,1	.33992	88,4	.9419	76,5
0.355	0.36250	106,4	1.06368	36,3	0.34080	88,4	2.9343	76,1
.356	.36357	106,4	.06404	36,4	.34169	88,3	.9267	75,7
.357	.36463	106,4	.06440	36,5	.34257	88,3	.9191	75,2
.358	.36570	106,5	.06477	36,6	.34345	88,2	.9116	74,8
.359	.36676	106,5	.06514	36,7	.34433	88,1	.9042	74,3
0.360	0.36783	106,6	1.06550	36,8	0.34521	88,1	2.8968	73,9
.361	.36889	106,6	.06587	36,9	.34609	88,0	.8894	73,5
.362	.36996	106,6	.06624	37,0	.34697	88,0	.8821	73,1
.363	.37102	106,7	.06661	37,1	.34785	87,9	.8748	72,6
.364	.37209	106,7	.06698	37,2	.34873	87,8	.8675	72,2
0.365	0.37316	106,7	1.06736	37,3	0.34961	87,8	2.8603	71,8
.366	.37423	106,8	.06773	37,4	.35049	87,7	.8532	71,4
.367	.37529	106,8	.06810	37,5	.35136	87,7	.8460	71,0
.368	.37636	106,8	.06848	37,6	.35224	87,6	.8390	70,6
.369	.37743	106,9	.06886	37,7	.35312	87,5	.8319	70,2
0.370	0.37850	106,9	1.06923	37,9	0.35399	87,5	2.8249	69,8
.371	.37957	107,0	.06961	38,0	.35487	87,4	.8180	69,4
.372	.38064	107,0	.06999	38,1	.35574	87,3	.8110	69,0
.373	.38171	107,0	.07037	38,2	.35661	87,3	.8042	68,6
.374	.38278	107,1	.07076	38,3	.35749	87,2	.7973	68,2
0.375	0.38385	107,1	1.07114	38,4	0.35836	87,2	2.7905	67,9
.376	.38492	107,2	.07152	38,5	.35923	87,1	.7837	67,5
.377	.38599	107,2	.07191	38,6	.36010	87,0	.7770	67,1
.378	.38707	107,2	.07230	38,7	.36097	87,0	.7703	66,7
.379	.38814	107,3	.07268	38,8	.36184	86,9	.7637	66,4
0.380	0.38921	107,3	1.07307	38,9	0.36271	86,8	2.7570	66,0
.381	.39028	107,3	.07346	39,0	.36358	86,8	.7505	65,7
.382	.39136	107,4	.07385	39,1	.36444	86,7	.7439	65,3
.383	.39243	107,4	.07425	39,2	.36531	86,7	.7374	64,9
.384	.39351	107,5	.07464	39,4	.36618	86,6	.7309	64,6
0.385	0.39458	107,5	1.07503	39,5	0.36704	86,5	2.7245	64,2
.386	.39566	107,5	.07543	39,6	.36791	86,5	.7181	63,9
.387	.39673	107,6	.07582	39,7	.36877	86,4	.7117	63,5
.388	.39781	107,6	.07622	39,8	.36963	86,3	.7054	63,2
.389	.39889	107,7	.07662	39,9	.37050	86,3	.6991	62,8
0.390	0.39996	107,7	1.07702	40,0	0.37136	86,2	2.6928	62,5
.391	.40104	107,7	.07742	40,1	.37222	86,1	.6866	62,2
.392	.40212	107,8	.07782	40,2	.37308	86,1	.6804	61,8
.393	.40319	107,8	.07822	40,3	.37394	86,0	.6742	61,5
.394	.40427	107,9	.07863	40,4	.37480	86,0	.6681	61,2
0.395	0.40535	107,9	1.07903	40,5	0.37566	85,9	2.6620	60,9
.396	.40643	107,9	.07944	40,6	.37652	85,8	.6559	60,5
.397	.40751	108,0	.07984	40,8	.37738	85,8	.6499	60,2
.398	.40859	108,0	.08025	40,9	.37824	85,7	.6438	59,9
.399	.40967	108,1	.08066	41,0	.37909	85,6	.6379	59,6
0.400	0.41075	108,1	1.08107	41,1	0.37995	85,6	2.6319	59,3
u	ln gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$
0.400	0.41075	108.1	1.08107	41.1	0.37905	85.6	2.6310	59.3
.401	.41183	108.1	.08118	41.2	.38080	85.5	.0390	59.0
.402	.41292	108.2	.08190	41.3	.38166	85.4	.6301	58.7
.403	.41400	108.2	.08231	41.4	.38251	85.4	.0143	58.3
.404	.41508	108.3	.08272	41.5	.38337	85.3	.6815	58.0
0.405	0.41616	108.3	1.08314	41.6	0.38422	85.3	2.6027	57.7
.406	.41725	108.4	.08356	41.7	.38507	85.2	.3970	57.4
.407	.41833	108.4	.08397	41.8	.38592	85.1	.8012	57.1
.408	.41941	108.4	.08439	41.9	.38677	85.0	.3353	56.8
.409	.42050	108.5	.08481	42.0	.38762	85.0	.5203	56.6
0.410	0.42158	108.5	1.08523	42.2	0.38847	84.9	2.5713	56.3
.411	.42267	108.6	.08566	42.3	.38932	84.8	.3886	56.0
.412	.42376	108.6	.08608	42.4	.39017	84.8	.5640	55.7
.413	.42484	108.7	.08650	42.5	.39103	84.7	.5374	55.4
.414	.42593	108.7	.08693	42.6	.39188	84.6	.5310	55.1
0.415	0.42702	108.7	1.08736	42.7	0.39271	84.6	2.5464	54.8
.416	.42810	108.8	.08778	42.8	.39356	84.5	.5409	54.6
.417	.42919	108.8	.08821	42.9	.39440	84.4	.5355	54.3
.418	.43028	108.9	.08863	43.0	.39524	84.4	.5301	54.0
.419	.43137	108.9	.08907	43.1	.39609	84.3	.5247	53.7
0.420	0.43246	109.0	1.08950	43.2	0.39693	84.2	2.5103	53.5
.421	.43355	109.0	.08991	43.3	.39777	84.1	.5149	53.2
.422	.43464	109.0	.09037	43.4	.39861	84.1	.5095	52.9
.423	.43573	109.1	.09081	43.5	.39945	84.0	.5041	52.7
.424	.43682	109.1	.09124	43.7	.40029	84.0	.4987	52.4
0.425	0.43791	109.2	1.09168	43.8	0.40113	83.9	2.4929	52.2
.426	.43900	109.2	.09212	43.9	.40197	83.8	.4877	51.9
.427	.44009	109.3	.09256	44.0	.40281	83.8	.4826	51.6
.428	.44119	109.3	.09300	44.1	.40365	83.7	.4774	51.4
.429	.44228	109.3	.09344	44.2	.40449	83.6	.4723	51.1
0.430	0.44337	109.4	1.09388	44.3	0.40532	83.6	2.4672	50.9
.431	.44447	109.4	.09433	44.4	.40616	83.5	.4621	50.6
.432	.44556	109.5	.09477	44.5	.40700	83.4	.4571	50.4
.433	.44666	109.5	.09522	44.7	.40783	83.4	.4520	50.1
.434	.44775	109.6	.09567	44.8	.40866	83.3	.4470	49.9
0.435	0.44885	109.6	1.09611	44.9	0.40949	83.2	2.4421	49.6
.436	.44995	109.7	.09656	45.0	.41032	83.2	.4371	49.4
.437	.45104	109.7	.09701	45.1	.41115	83.1	.4322	49.2
.438	.45214	109.7	.09747	45.2	.41199	83.0	.4273	48.9
.439	.45324	109.8	.09792	45.3	.41282	83.0	.4224	48.7
0.440	0.45434	109.8	1.09837	45.4	0.41364	82.9	2.4175	48.4
.441	.45543	109.9	.09883	45.5	.41447	82.8	.4127	48.2
.442	.45653	109.9	.09928	45.7	.41530	82.8	.4079	48.0
.443	.45763	110.0	.09974	45.8	.41613	82.7	.4031	47.7
.444	.45873	110.0	.10020	45.9	.41695	82.6	.3983	47.5
0.445	0.45983	110.1	1.10066	46.0	0.41778	82.5	2.3936	47.3
.446	.46093	110.1	.10112	46.1	.41861	82.5	.3889	47.1
.447	.46204	110.2	.10158	46.2	.41943	82.4	.3842	46.8
.448	.46314	110.2	.10204	46.3	.42025	82.3	.3795	46.6
.449	.46424	110.3	.10251	46.4	.42108	82.3	.3749	46.4
0.450	0.46534	110.3	1.10297	46.5	0.42190	82.2	2.3702	46.2
u	tanh u	$\omega F_u'$	sech u	$\omega F_u'$	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.450	0.46534	110,3	1.10297	46,5	0.42190	82,2	2.3702	46,2
.451	.46645	110,3	.10344	46,6	.42272	82,1	.3656	46,0
.452	.46755	110,4	.10390	46,8	.42354	82,1	.3610	45,7
.453	.46865	110,4	.10437	46,9	.42436	82,0	.3565	45,5
.454	.46976	110,5	.10484	47,0	.42518	81,9	.3519	45,3
0.455	0.47086	110,5	1.10531	47,1	0.42600	81,9	2.3474	45,1
.456	.47197	110,6	.10578	47,2	.42682	81,8	.3429	44,9
.457	.47307	110,6	.10625	47,3	.42764	81,7	.3384	44,7
.458	.47418	110,7	.10673	47,4	.42845	81,6	.3340	44,5
.459	.47529	110,7	.10720	47,5	.42927	81,6	.3295	44,3
0.460	0.47640	110,8	1.10768	47,6	0.43008	81,5	2.3251	44,1
.461	.47750	110,8	.10816	47,8	.43090	81,4	.3207	43,9
.462	.47861	110,9	.10863	47,9	.43171	81,4	.3164	43,7
.463	.47972	110,9	.10911	48,0	.43253	81,3	.3120	43,5
.464	.48083	111,0	.10959	48,1	.43334	81,2	.3077	43,3
0.465	0.48194	111,0	1.11007	48,2	0.43415	81,2	2.3033	43,1
.466	.48305	111,1	.11056	48,3	.43496	81,1	.2991	42,9
.467	.48416	111,1	.11104	48,4	.43577	81,0	.2948	42,7
.468	.48527	111,2	.11153	48,5	.43658	80,9	.2905	42,5
.469	.48638	111,2	.11201	48,6	.43739	80,9	.2863	42,3
0.470	0.48750	111,2	1.11250	48,7	0.43820	80,8	2.2821	42,1
.471	.48861	111,3	.11299	48,9	.43901	80,7	.2779	41,9
.472	.48972	111,3	.11348	49,0	.43981	80,7	.2737	41,7
.473	.49084	111,4	.11397	49,1	.44062	80,6	.2695	41,5
.474	.49195	111,4	.11446	49,2	.44143	80,5	.2654	41,3
0.475	0.49306	111,5	1.11495	49,3	0.44223	80,4	2.2613	41,1
.476	.49418	111,5	.11544	49,4	.44303	80,4	.2572	40,9
.477	.49530	111,6	.11594	49,5	.44384	80,3	.2531	40,8
.478	.49641	111,6	.11643	49,6	.44464	80,2	.2490	40,6
.479	.49753	111,7	.11693	49,8	.44544	80,2	.2450	40,4
0.480	0.49865	111,7	1.11743	49,9	0.44624	80,1	2.2409	40,2
.481	.49976	111,8	.11793	50,0	.44704	80,0	.2369	40,0
.482	.50088	111,8	.11843	50,1	.44784	79,9	.2329	39,9
.483	.50200	111,9	.11893	50,2	.44864	79,9	.2289	39,7
.484	.50312	111,9	.11943	50,3	.44944	79,8	.2250	39,5
0.485	0.50424	112,0	1.11994	50,4	0.45024	79,7	2.2210	39,3
.486	.50536	112,0	.12044	50,5	.45104	79,7	.2171	39,2
.487	.50648	112,1	.12095	50,6	.45183	79,6	.2132	39,0
.488	.50760	112,1	.12145	50,8	.45263	79,5	.2093	38,8
.489	.50872	112,2	.12195	50,9	.45342	79,4	.2054	38,6
0.490	0.50984	112,2	1.12247	51,0	0.45422	79,4	2.2016	38,5
.491	.51097	112,3	.12298	51,1	.45501	79,3	.1978	38,3
.492	.51209	112,3	.12349	51,2	.45580	79,2	.1939	38,1
.493	.51321	112,4	.12401	51,3	.45659	79,2	.1901	38,0
.494	.51434	112,5	.12452	51,4	.45739	79,1	.1863	37,8
0.495	0.51546	112,5	1.12503	51,5	0.45818	79,0	2.1826	37,6
.496	.51659	112,6	.12555	51,7	.45897	78,9	.1788	37,5
.497	.51771	112,6	.12607	51,8	.45975	78,9	.1751	37,3
.498	.51884	112,7	.12659	51,9	.46054	78,8	.1714	37,1
.499	.51997	112,7	.12711	52,0	.46133	78,7	.1676	37,0
0.500	0.52110	112,8	1.12763	52,1	0.46212	78,6	2.1640	36,8
	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\cosh u$	sinh u	$\cosh u$	sinh u	$\cosh u$	sinh u	$\cosh u$
0.500	0.52110	1.12763	52.1	1.12763	0.46212	78.6	2.1610	36.8
.501	.52222	1.12815	52.2	1.12815	.46300	78.6	.1603	36.7
.502	.52335	1.12867	52.3	1.12867	.46388	78.5	.1596	36.5
.503	.52448	1.12919	52.4	1.12919	.46476	78.4	.1589	36.4
.504	.52561	1.12972	52.5	1.12972	.46564	78.4	.1583	36.2
0.505	0.52674	1.13025	52.7	1.13025	0.46651	78.3	2.1457	36.0
.506	.52787	1.13077	52.8	1.13077	.46739	78.2	.1451	35.9
.507	.52900	1.13130	52.9	1.13130	.46827	78.1	.1444	35.7
.508	.53013	1.13183	53.0	1.13183	.46915	78.1	.1438	35.6
.509	.53127	1.13236	53.1	1.13236	.47003	78.0	.1431	35.4
0.510	0.53240	1.13289	53.2	1.13289	0.47091	77.9	2.1270	35.3
.511	.53353	1.13343	53.3	1.13343	.47179	77.9	.1424	35.1
.512	.53466	1.13396	53.4	1.13396	.47267	77.8	.1418	35.0
.513	.53580	1.13450	53.5	1.13450	.47355	77.7	.1411	34.8
.514	.53693	1.13503	53.7	1.13503	.47443	77.6	.1405	34.7
0.515	0.53807	1.13557	53.8	1.13557	0.47531	77.5	2.1105	34.5
.516	.53920	1.13611	53.9	1.13611	.47619	77.5	.1400	34.4
.517	.54034	1.13665	54.0	1.13665	.47707	77.4	.1393	34.3
.518	.54148	1.13719	54.1	1.13719	.47795	77.3	.1387	34.1
.519	.54262	1.13773	54.3	1.13773	.47883	77.3	.1380	34.0
0.520	0.54375	1.13827	54.4	1.13827	0.47971	77.2	2.0934	33.8
.521	.54489	1.13881	54.5	1.13881	.48059	77.1	.1378	33.7
.522	.54603	1.13936	54.6	1.13936	.48147	77.0	.1370	33.5
.523	.54717	1.14000	54.7	1.14000	.48235	77.0	.1363	33.4
.524	.54831	1.14064	54.8	1.14064	.48323	76.9	.1357	33.3
0.525	0.54945	1.14118	54.9	1.14118	0.48411	76.8	2.0760	33.1
.526	.55059	1.14172	55.0	1.14172	.48499	76.7	.1350	33.0
.527	.55173	1.14226	55.1	1.14226	.48587	76.7	.1343	32.9
.528	.55287	1.14280	55.2	1.14280	.48675	76.6	.1337	32.7
.529	.55401	1.14334	55.3	1.14334	.48763	76.5	.1330	32.6
0.530	0.55516	1.14388	55.4	1.14388	0.48851	76.4	2.0586	32.4
.531	.55630	1.14442	55.5	1.14442	.48939	76.4	.1324	32.3
.532	.55744	1.14496	55.6	1.14496	.49027	76.3	.1317	32.2
.533	.55858	1.14550	55.7	1.14550	.49115	76.2	.1311	32.0
.534	.55972	1.14604	55.8	1.14604	.49203	76.1	.1304	31.9
0.535	0.56086	1.14658	55.9	1.14658	0.49291	76.1	2.0412	31.8
.536	.56200	1.14712	56.0	1.14712	.49379	76.0	.1300	31.7
.537	.56314	1.14766	56.1	1.14766	.49467	75.9	.1293	31.5
.538	.56428	1.14820	56.2	1.14820	.49555	75.8	.1287	31.4
.539	.56542	1.14874	56.3	1.14874	.49643	75.8	.1280	31.3
0.540	0.56656	1.14928	56.4	1.14928	0.49731	75.7	2.0238	31.1
.541	.56770	1.14982	56.5	1.14982	.49819	75.6	.1274	31.0
.542	.56884	1.15036	56.6	1.15036	.49907	75.5	.1267	30.9
.543	.57000	1.15090	56.7	1.15090	.49995	75.5	.1261	30.8
.544	.57114	1.15144	56.8	1.15144	.50083	75.4	.1254	30.6
0.545	0.57228	1.15198	56.9	1.15198	0.50171	75.3	2.0064	30.5
.546	.57342	1.15252	57.0	1.15252	.50259	75.2	.1248	30.4
.547	.57456	1.15306	57.1	1.15306	.50347	75.1	.1241	30.3
.548	.57570	1.15360	57.2	1.15360	.50435	75.1	.1235	30.2
.549	.57684	1.15414	57.3	1.15414	.50523	75.0	.1228	30.0
0.550	0.57798	1.15468	57.4	1.15468	0.50611	74.9	1.9890	29.9
u	tanh u	$\operatorname{sech} u$	sinh u	$\cosh u$	sinh u	$\cosh u$	sinh u	$\cosh u$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.550	0.57815	115.5	1.15510	57.8	0.50052	74.9	1.9979	29.9
.551	.57931	115.6	.15568	57.9	.50127	74.9	.9949	29.8
.552	.58046	115.6	.15626	58.0	.50202	74.8	.9920	29.7
.553	.58162	115.7	.15684	58.1	.50277	74.7	.9890	29.6
.554	.58278	115.7	.15742	58.2	.50351	74.6	.9860	29.5
0.555	0.58393	115.8	1.15801	58.3	0.50426	74.6	1.9831	29.3
.556	.58509	115.9	.15859	58.5	.50500	74.5	.9802	29.2
.557	.58625	115.9	.15918	58.6	.50575	74.4	.9773	29.1
.558	.58741	116.0	.15976	58.7	.50649	74.3	.9744	29.0
.559	.58857	116.0	.16035	58.9	.50724	74.3	.9715	28.9
0.560	0.58973	116.1	1.16094	59.0	0.50798	74.2	1.9686	28.8
.561	.59089	116.2	.16153	59.1	.50872	74.1	.9657	28.6
.562	.59205	116.2	.16212	59.2	.50946	74.0	.9629	28.5
.563	.59321	116.3	.16272	59.3	.51020	74.0	.9600	28.4
.564	.59438	116.3	.16331	59.4	.51094	73.9	.9572	28.3
0.565	0.59554	116.4	1.16390	59.6	0.51168	73.8	1.9544	28.2
.566	.59671	116.5	.16450	59.7	.51242	73.7	.9515	28.1
.567	.59787	116.5	.16510	59.8	.51315	73.7	.9487	28.0
.568	.59904	116.6	.16570	59.9	.51389	73.6	.9459	27.9
.569	.60020	116.6	.16630	60.0	.51462	73.5	.9432	27.8
0.570	0.60137	116.7	1.16690	60.1	0.51536	73.4	1.9404	27.7
.571	.60254	116.7	.16750	60.3	.51609	73.4	.9376	27.5
.572	.60371	116.8	.16810	60.4	.51683	73.3	.9349	27.4
.573	.60487	116.9	.16871	60.5	.51756	73.2	.9321	27.3
.574	.60604	116.9	.16931	60.6	.51829	73.1	.9294	27.2
0.575	0.60721	117.0	1.16993	60.7	0.51902	73.1	1.9267	27.1
.576	.60838	117.1	.17053	60.8	.51975	73.0	.9240	27.0
.577	.60955	117.1	.17113	61.0	.52048	72.9	.9213	26.9
.578	.61072	117.2	.17174	61.1	.52121	72.8	.9186	26.8
.579	.61189	117.2	.17236	61.2	.52194	72.8	.9159	26.7
0.580	0.61307	117.3	1.17297	61.3	0.52267	72.7	1.9133	26.6
.581	.61424	117.4	.17358	61.4	.52339	72.6	.9106	26.5
.582	.61542	117.4	.17420	61.5	.52412	72.5	.9080	26.4
.583	.61659	117.5	.17481	61.7	.52484	72.5	.9053	26.3
.584	.61777	117.5	.17543	61.8	.52557	72.4	.9027	26.2
0.585	0.61894	117.6	1.17605	61.9	0.52629	72.3	1.9001	26.1
.586	.62012	117.7	.17667	62.0	.52701	72.2	.8975	26.0
.587	.62130	117.7	.17729	62.1	.52773	72.2	.8949	25.9
.588	.62247	117.8	.17791	62.2	.52846	72.1	.8923	25.8
.589	.62365	117.9	.17853	62.4	.52918	72.0	.8897	25.7
0.590	0.62483	117.9	1.17916	62.5	0.52990	71.9	1.8872	25.6
.591	.62601	118.0	.17978	62.6	.53061	71.8	.8846	25.5
.592	.62719	118.0	.18041	62.7	.53133	71.8	.8821	25.4
.593	.62837	118.1	.18104	62.8	.53205	71.7	.8795	25.3
.594	.62955	118.2	.18167	63.0	.53277	71.6	.8770	25.2
0.595	0.63073	118.2	1.18230	63.1	0.53348	71.5	1.8745	25.1
.596	.63192	118.3	.18293	63.2	.53420	71.5	.8720	25.0
.597	.63310	118.4	.18356	63.3	.53491	71.4	.8695	24.9
.598	.63428	118.4	.18419	63.4	.53562	71.3	.8670	24.8
.599	.63547	118.5	.18483	63.5	.53634	71.2	.8645	24.7
0.600	0.63665	118.5	1.18547	63.7	0.53705	71.2	1.8620	24.7
u	tanh u	$\omega F_0'$	sec u	$\omega F_0'$	sin u	$\omega F_0'$	cos u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.600	0.63665	118.5	1.18547	63.7	0.53705	71.2	1.8630	24.7
.601	.63784	118.6	.18610	63.8	.53770	71.1	.8596	24.6
.602	.63903	118.7	.18674	63.9	.53837	71.0	.8571	24.5
.603	.64021	118.7	.18738	64.0	.53908	70.9	.8547	24.4
.604	.64140	118.8	.18802	64.1	.53989	70.9	.8522	24.3
0.605	0.64259	118.9	1.18866	64.3	0.54050	70.8	1.8498	24.2
.606	.64378	118.9	.18931	64.4	.54131	70.7	.8474	24.1
.607	.64497	119.0	.18995	64.5	.54201	70.6	.8450	24.0
.608	.64616	119.1	.19060	64.6	.54272	70.5	.8426	23.9
.609	.64735	119.1	.19124	64.7	.54342	70.5	.8402	23.9
0.610	0.64854	119.2	1.19189	64.9	0.54413	70.4	1.8378	23.8
.611	.64973	119.3	.19254	65.0	.54484	70.3	.8354	23.7
.612	.65093	119.3	.19319	65.1	.54553	70.3	.8330	23.6
.613	.65212	119.4	.19384	65.2	.54624	70.2	.8307	23.5
.614	.65331	119.4	.19449	65.3	.54694	70.1	.8284	23.4
0.615	0.65451	119.5	1.19515	65.5	0.54764	70.0	1.8260	23.3
.616	.65570	119.6	.19580	65.6	.54834	69.9	.8237	23.3
.617	.65690	119.6	.19646	65.7	.54904	69.9	.8214	23.2
.618	.65810	119.7	.19712	65.8	.54973	69.8	.8191	23.1
.619	.65929	119.8	.19778	65.9	.55043	69.7	.8168	23.0
0.620	0.66049	119.8	1.19844	66.0	0.55113	69.6	1.8145	22.9
.621	.66169	119.9	.19910	66.2	.55182	69.5	.8122	22.8
.622	.66289	120.0	.19976	66.3	.55252	69.5	.8099	22.8
.623	.66409	120.0	.20042	66.4	.55321	69.4	.8076	22.7
.624	.66529	120.1	.20109	66.5	.55391	69.3	.8054	22.6
0.625	0.66649	120.2	1.20175	66.6	0.55460	69.2	1.8031	22.5
.626	.66769	120.2	.20242	66.8	.55529	69.2	.8009	22.4
.627	.66890	120.3	.20309	66.9	.55598	69.1	.7986	22.4
.628	.67010	120.4	.20375	67.0	.55667	69.0	.7964	22.3
.629	.67130	120.4	.20443	67.1	.55736	68.9	.7942	22.2
0.630	0.67251	120.5	1.20510	67.3	0.55805	68.9	1.7919	22.1
.631	.67371	120.6	.20577	67.4	.55874	68.8	.7897	22.0
.632	.67492	120.6	.20645	67.5	.55943	68.7	.7875	22.0
.633	.67613	120.7	.20712	67.6	.56011	68.6	.7853	21.9
.634	.67734	120.8	.20780	67.7	.56080	68.6	.7832	21.8
0.635	0.67854	120.8	1.20848	67.9	0.56149	68.5	1.7810	21.7
.636	.67975	120.9	.20916	68.0	.56217	68.4	.7788	21.6
.637	.68096	121.0	.20984	68.1	.56285	68.3	.7767	21.6
.638	.68217	121.1	.21052	68.2	.56354	68.2	.7745	21.5
.639	.68338	121.1	.21120	68.3	.56422	68.2	.7724	21.4
0.640	0.68459	121.2	1.21189	68.5	0.56490	68.1	1.7702	21.3
.641	.68581	121.3	.21257	68.6	.56558	68.0	.7681	21.3
.642	.68702	121.3	.21326	68.7	.56626	67.9	.7660	21.2
.643	.68823	121.4	.21395	68.8	.56694	67.9	.7639	21.1
.644	.68945	121.5	.21463	68.9	.56762	67.8	.7618	21.0
0.645	0.69066	121.5	1.21532	69.1	0.56830	67.7	1.7597	21.0
.646	.69188	121.6	.21602	69.2	.56897	67.6	.7576	20.9
.647	.69309	121.7	.21671	69.3	.56965	67.6	.7555	20.8
.648	.69431	121.7	.21740	69.4	.57032	67.5	.7534	20.7
.649	.69553	121.8	.21810	69.6	.57100	67.4	.7513	20.7
0.650	0.69675	121.9	1.21879	69.7	0.57167	67.3	1.7493	20.6
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.650	0.69675	121.9	1.21879	69.7	0.57167	67.3	1.7493	20.6
.651	.69797	121.9	.21919	69.8	.57231	67.2	.7472	20.5
.652	.69919	122.0	.22019	69.9	.57301	67.2	.7452	20.5
.653	.70041	122.1	.22089	70.0	.57369	67.1	.7431	20.4
.654	.70163	122.2	.22159	70.2	.57436	67.0	.7411	20.3
0.655	0.70285	122.2	1.22229	70.3	0.57503	66.9	1.7391	20.2
.656	.70407	122.3	.22300	70.4	.57570	66.9	.7370	20.2
.657	.70530	122.4	.22370	70.5	.57636	66.8	.7350	20.1
.658	.70651	122.4	.22441	70.7	.57703	66.7	.7330	20.0
.659	.70775	122.5	.22511	70.8	.57770	66.6	.7310	20.0
0.660	0.70897	122.6	1.22582	70.9	0.57836	66.5	1.7290	19.9
.661	.71020	122.7	.22653	71.0	.57903	66.5	.7270	19.8
.662	.71142	122.7	.22724	71.1	.57969	66.4	.7251	19.8
.663	.71265	122.8	.22795	71.3	.58036	66.3	.7231	19.7
.664	.71388	122.9	.22867	71.4	.58102	66.2	.7211	19.6
0.665	0.71511	122.9	1.22938	71.5	0.58168	66.2	1.7192	19.6
.666	.71634	123.0	.23010	71.6	.58234	66.1	.7172	19.5
.667	.71757	123.1	.23081	71.8	.58300	66.0	.7153	19.4
.668	.71880	123.2	.23153	71.9	.58366	65.9	.7133	19.4
.669	.72003	123.2	.23225	72.0	.58432	65.9	.7114	19.3
0.670	0.72126	123.3	1.23297	72.1	0.58498	65.8	1.7095	19.2
.671	.72250	123.4	.23369	72.2	.58564	65.7	.7075	19.2
.672	.72373	123.4	.23441	72.4	.58629	65.6	.7056	19.1
.673	.72497	123.5	.23514	72.5	.58695	65.5	.7037	19.0
.674	.72620	123.6	.23587	72.6	.58760	65.5	.7018	19.0
0.675	0.72744	123.7	1.23659	72.7	0.58826	65.4	1.6999	18.9
.676	.72868	123.7	.23732	72.9	.58891	65.3	.6980	18.8
.677	.72991	123.8	.23805	73.0	.58957	65.2	.6962	18.8
.678	.73115	123.9	.23878	73.1	.59022	65.2	.6943	18.7
.679	.73239	124.0	.23951	73.2	.59087	65.1	.6924	18.6
0.680	0.73363	124.0	1.24025	73.3	0.59152	65.0	1.6906	18.6
.681	.73487	124.1	.24098	73.5	.59217	64.9	.6887	18.5
.682	.73611	124.2	.24172	73.6	.59282	64.9	.6869	18.5
.683	.73735	124.2	.24245	73.7	.59347	64.8	.6850	18.4
.684	.73860	124.3	.24319	73.9	.59411	64.7	.6832	18.3
0.685	0.73984	124.4	1.24393	74.0	0.59476	64.6	1.6813	18.3
.686	.74109	124.5	.24467	74.1	.59541	64.5	.6795	18.2
.687	.74233	124.5	.24541	74.2	.59605	64.5	.6777	18.1
.688	.74358	124.6	.24616	74.4	.59670	64.4	.6759	18.1
.689	.74482	124.7	.24690	74.5	.59734	64.3	.6741	18.0
0.690	0.74607	124.8	1.24765	74.6	0.59798	64.2	1.6723	18.0
.691	.74732	124.8	.24839	74.7	.59862	64.2	.6705	17.9
.692	.74857	124.9	.24914	74.9	.59927	64.1	.6687	17.8
.693	.74982	125.0	.24989	75.0	.59991	64.0	.6669	17.8
.694	.75107	125.1	.25064	75.1	.60055	63.9	.6652	17.7
0.695	0.75232	125.1	1.25139	75.2	0.60118	63.9	1.6634	17.7
.696	.75357	125.2	.25214	75.4	.60182	63.8	.6616	17.6
.697	.75482	125.3	.25290	75.5	.60246	63.7	.6599	17.6
.698	.75607	125.4	.25365	75.6	.60310	63.6	.6581	17.5
.699	.75733	125.4	.25441	75.7	.60373	63.6	.6564	17.4
0.700	0.75858	125.5	1.25517	75.9	0.60437	63.5	1.6546	17.4
u	tanh u	$\omega F_0'$	coth u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$



# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	cnth u	$\omega F_0'$
0.700	0.75858	125.5	1.25517	75.0	0.60437	0.3,5	1.0540	17.4
.701	.75984	125.6	.25533	76.0	.60500	0.3,4	.0550	17.3
.702	.76110	125.7	.25600	76.1	.60574	0.3,3	.0512	17.3
.703	.76235	125.7	.25715	76.2	.60627	0.3,2	.0491	17.2
.704	.76361	125.8	.25821	76.4	.60690	0.3,2	.0477	17.1
0.705	0.76487	125.9	1.25868	76.5	0.60753	0.3,1	1.0460	17.1
.706	.76613	126.0	.25974	76.6	.60816	0.3,0	.0443	17.0
.707	.76739	126.1	.26051	76.7	.60879	0.2,9	.0429	17.0
.708	.76865	126.1	.26138	76.9	.60942	0.2,8	.0409	16.9
.709	.76991	126.2	.26205	77.0	.61005	0.2,8	.0401	16.9
0.710	0.77117	126.3	1.26282	77.1	0.61068	0.2,7	1.0375	16.8
.711	.77244	126.4	.26359	77.2	.61130	0.2,6	.0358	16.8
.712	.77370	126.4	.26436	77.4	.61193	0.2,6	.0344	16.7
.713	.77497	126.5	.26514	77.5	.61255	0.2,5	.0335	16.7
.714	.77623	126.6	.26591	77.6	.61318	0.2,4	.0328	16.6
0.715	0.77750	126.7	1.26666	77.7	0.61380	0.2,3	1.0304	16.5
.716	.77876	126.7	.26747	77.9	.61443	0.2,3	.0275	16.5
.717	.78003	126.8	.26825	78.0	.61505	0.2,2	.0259	16.4
.718	.78130	126.9	.26903	78.1	.61567	0.2,1	.0244	16.4
.719	.78257	127.0	.26981	78.3	.61629	0.2,0	.0236	16.3
0.720	0.78384	127.1	1.27059	78.4	0.61691	0.1,9	1.0210	16.3
.721	.78511	127.1	.27138	78.5	.61753	0.1,9	.0194	16.2
.722	.78638	127.2	.27216	78.6	.61815	0.1,8	.0177	16.2
.723	.78766	127.3	.27295	78.8	.61876	0.1,7	.0161	16.1
.724	.78893	127.4	.27374	78.9	.61938	0.1,6	.0145	16.1
0.725	0.79020	127.5	1.27453	79.0	0.62000	0.1,6	1.0130	16.0
.726	.79148	127.5	.27532	79.1	.62061	0.1,5	.0114	16.0
.727	.79275	127.6	.27611	79.3	.62123	0.1,4	.0097	15.9
.728	.79403	127.7	.27690	79.4	.62184	0.1,3	.0081	15.9
.729	.79531	127.8	.27770	79.5	.62245	0.1,3	.0065	15.8
0.730	0.79659	127.8	1.27849	79.7	0.62307	0.1,2	1.0050	15.8
.731	.79786	127.9	.27929	79.8	.62368	0.1,1	.0034	15.7
.732	.79914	128.0	.28009	79.9	.62429	0.1,0	.0018	15.7
.733	.80042	128.1	.28089	80.0	.62490	0.1,0	.0003	15.6
.734	.80171	128.2	.28169	80.2	.62551	0.0,9	.9987	15.6
0.735	0.80299	128.2	1.28249	80.3	0.62611	0.0,8	1.5974	15.5
.736	.80427	128.3	.28330	80.4	.62672	0.0,7	.9956	15.5
.737	.80555	128.4	.28410	80.6	.62733	0.0,6	.9941	15.4
.738	.80684	128.5	.28491	80.7	.62794	0.0,6	.9925	15.4
.739	.80812	128.6	.28572	80.8	.62854	0.0,5	.9910	15.3
0.740	0.80941	128.7	1.28652	80.9	0.62915	0.0,4	1.5895	15.3
.741	.81070	128.7	.28733	81.1	.62975	0.0,3	.9879	15.2
.742	.81199	128.8	.28815	81.2	.63035	0.0,3	.9864	15.2
.743	.81327	128.9	.28896	81.3	.63095	0.0,2	.9849	15.1
.744	.81456	129.0	.28977	81.5	.63156	0.0,1	.9834	15.1
0.745	0.81585	129.1	1.29059	81.6	0.63216	0.0,0	1.5810	15.0
.746	.81714	129.1	.29140	81.7	.63276	0.0,0	.9804	15.0
.747	.81844	129.2	.29222	81.8	.63335	0.0,0	.9789	14.9
.748	.81973	129.3	.29304	82.0	.63395	0.0,8	.9774	14.9
.749	.82102	129.4	.29386	82.1	.63455	0.0,7	.9759	14.8
0.750	0.82232	129.5	1.29468	82.2	0.63515	0.0,7	1.5744	14.8
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.750	0.82432	129.5	1.29468	82.2	0.63515	59.7	1.5744	14.8
.751	.82461	129.6	.29551	82.4	.63575	59.6	.5730	14.7
.752	.82491	129.6	.29633	82.5	.63634	59.5	.5715	14.7
.753	.82520	129.7	.29716	82.6	.63691	59.4	.5700	14.6
.754	.82550	129.8	.29798	82.8	.63753	59.4	.5686	14.6
0.755	0.82880	129.9	1.29881	82.9	0.63812	59.3	1.5671	14.6
.756	.83010	130.0	.29964	83.0	.63871	59.2	.5656	14.5
.757	.83140	130.0	.30047	83.1	.63931	59.1	.5642	14.5
.758	.83170	130.1	.30130	83.3	.63990	59.1	.5628	14.4
.759	.83400	130.2	.30211	83.4	.64049	59.0	.5613	14.4
0.760	0.83530	130.3	1.30297	83.5	0.64108	58.9	1.5599	14.3
.761	.83661	130.4	.30381	83.7	.64167	58.8	.5584	14.3
.762	.83791	130.5	.30464	83.8	.64225	58.8	.5570	14.2
.763	.83922	130.5	.30548	83.9	.64284	58.7	.5556	14.2
.764	.84052	130.6	.30632	84.1	.64343	58.6	.5542	14.2
0.765	0.84183	130.7	1.30716	84.2	0.64401	58.5	1.5528	14.1
.766	.84314	130.8	.30801	84.3	.64460	58.4	.5514	14.1
.767	.84445	130.9	.30885	84.4	.64518	58.4	.5500	14.0
.768	.84576	131.0	.30970	84.6	.64576	58.3	.5486	14.0
.769	.84707	131.1	.31054	84.7	.64635	58.2	.5472	13.9
0.770	0.84838	131.1	1.31139	84.8	0.64693	58.1	1.5458	13.9
.771	.84969	131.2	.31224	85.0	.64751	58.1	.5444	13.9
.772	.85100	131.3	.31309	85.1	.64809	58.0	.5430	13.8
.773	.85231	131.4	.31394	85.2	.64867	57.9	.5416	13.8
.774	.85363	131.5	.31479	85.4	.64925	57.8	.5402	13.7
0.775	0.85494	131.6	1.31565	85.5	0.64983	57.8	1.5389	13.7
.776	.85625	131.7	.31650	85.6	.65040	57.7	.5375	13.6
.777	.85758	131.7	.31736	85.8	.65098	57.6	.5361	13.6
.778	.85889	131.8	.31822	85.9	.65156	57.5	.5348	13.6
.779	.86021	131.9	.31908	86.0	.65213	57.5	.5334	13.5
0.780	0.86153	132.0	1.31994	86.2	0.65271	57.4	1.5321	13.5
.781	.86285	132.1	.32080	86.3	.65328	57.3	.5307	13.4
.782	.86417	132.2	.32166	86.4	.65385	57.2	.5294	13.4
.783	.86550	132.3	.32253	86.5	.65443	57.2	.5281	13.3
.784	.86682	132.3	.32340	86.7	.65500	57.1	.5267	13.3
0.785	0.86814	132.4	1.32426	86.8	0.65557	57.0	1.5254	13.3
.786	.86947	132.5	.32513	86.9	.65614	56.9	.5241	13.2
.787	.87079	132.6	.32600	87.1	.65671	56.9	.5228	13.2
.788	.87211	132.7	.32687	87.2	.65727	56.8	.5214	13.1
.789	.87345	132.8	.32775	87.3	.65784	56.7	.5201	13.1
0.790	0.87478	132.9	1.32862	87.5	0.65841	56.6	1.5188	13.1
.791	.87610	132.9	.32950	87.6	.65898	56.6	.5175	13.0
.792	.87743	133.0	.33037	87.7	.65954	56.5	.5162	13.0
.793	.87877	133.1	.33125	87.9	.66011	56.4	.5149	12.9
.794	.88010	133.2	.33213	88.0	.66067	56.4	.5136	12.9
0.795	0.88143	133.3	1.33301	88.1	0.66123	56.3	1.5123	12.9
.796	.88276	133.4	.33389	88.3	.66179	56.2	.5110	12.8
.797	.88410	133.5	.33478	88.4	.66236	56.1	.5098	12.8
.798	.88543	133.6	.33566	88.5	.66292	56.1	.5085	12.8
.799	.88677	133.7	.33655	88.7	.66348	56.0	.5072	12.7
0.800	0.88811	133.7	1.33743	88.8	0.66404	55.9	1.5059	12.7
u	log gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.800	0.88811	133.7	1.33743	88.8	0.66404	55.0	1.5050	12.7
.801	.88941	133.8	.33832	88.9	.66460	55.3	.5047	12.6
.802	.89078	133.9	.33921	89.1	.66515	55.8	.5034	12.6
.803	.89212	134.0	.34011	89.2	.66571	55.7	.5022	12.6
.804	.89346	134.1	.34100	89.3	.66627	55.6	.5009	12.5
0.805	0.89480	134.2	1.34189	89.5	0.66682	55.5	1.4990	12.5
.806	.89615	134.3	.34279	89.6	.66738	55.5	.4981	12.5
.807	.89749	134.4	.34368	89.7	.66793	55.4	.4972	12.4
.808	.89883	134.5	.34458	89.9	.66849	55.3	.4959	12.4
.809	.90018	134.5	.34548	90.0	.66904	55.2	.4947	12.3
0.810	0.90152	134.6	1.34638	90.2	0.66959	55.2	1.4935	12.3
.811	.90287	134.7	.34729	90.3	.67014	55.1	.4922	12.3
.812	.90422	134.8	.34819	90.4	.67069	55.0	.4910	12.2
.813	.90557	134.9	.34909	90.6	.67124	54.9	.4898	12.2
.814	.90692	135.0	.35000	90.7	.67179	54.9	.4885	12.2
0.815	0.90827	135.1	1.35091	90.8	0.67234	54.8	1.4873	12.1
.816	.90962	135.2	.35182	91.0	.67289	54.7	.4861	12.1
.817	.91097	135.3	.35273	91.1	.67343	54.6	.4849	12.0
.818	.91232	135.4	.35364	91.2	.67398	54.6	.4837	12.0
.819	.91368	135.5	.35455	91.4	.67453	54.5	.4825	12.0
0.820	0.91503	135.5	1.35547	91.5	0.67507	54.4	1.4813	11.9
.821	.91639	135.6	.35638	91.6	.67561	54.4	.4801	11.9
.822	.91775	135.7	.35730	91.8	.67616	54.3	.4789	11.9
.823	.91910	135.8	.35822	91.9	.67670	54.2	.4778	11.8
.824	.92046	135.9	.35914	92.0	.67724	54.1	.4766	11.8
0.825	0.92182	136.0	1.36006	92.2	0.67778	54.1	1.4754	11.8
.826	.92318	136.1	.36098	92.3	.67832	54.0	.4742	11.7
.827	.92454	136.2	.36190	92.5	.67886	53.9	.4731	11.7
.828	.92591	136.3	.36283	92.6	.67940	53.8	.4719	11.7
.829	.92727	136.4	.36376	92.7	.67994	53.8	.4707	11.6
0.830	0.92863	136.5	1.36468	92.9	0.68048	53.7	1.4696	11.6
.831	.93000	136.6	.36561	93.0	.68101	53.6	.4684	11.6
.832	.93137	136.7	.36654	93.1	.68155	53.5	.4672	11.5
.833	.93273	136.7	.36748	93.3	.68208	53.5	.4661	11.5
.834	.93410	136.8	.36841	93.4	.68262	53.4	.4649	11.5
0.835	0.93547	136.9	1.36934	93.5	0.68315	53.3	1.4638	11.4
.836	.93684	137.0	.37028	93.7	.68368	53.3	.4627	11.4
.837	.93821	137.1	.37122	93.8	.68421	53.2	.4615	11.4
.838	.93958	137.2	.37216	94.0	.68475	53.1	.4604	11.3
.839	.94095	137.3	.37310	94.1	.68528	53.0	.4593	11.3
0.840	0.94233	137.4	1.37404	94.2	0.68581	53.0	1.4581	11.3
.841	.94370	137.5	.37498	94.4	.68634	52.9	.4570	11.2
.842	.94508	137.6	.37593	94.5	.68687	52.8	.4559	11.2
.843	.94645	137.7	.37687	94.6	.68739	52.7	.4548	11.2
.844	.94783	137.8	.37782	94.8	.68792	52.7	.4537	11.1
0.845	0.94921	137.9	1.37877	94.9	0.68845	52.6	1.4525	11.1
.846	.95059	138.0	.37972	95.1	.68897	52.5	.4514	11.1
.847	.95197	138.1	.38067	95.2	.68950	52.5	.4503	11.0
.848	.95335	138.2	.38162	95.3	.69002	52.4	.4492	11.0
.849	.95473	138.3	.38258	95.5	.69055	52.3	.4481	11.0
0.850	0.95612	138.4	1.38353	95.6	0.69107	52.2	1.4470	10.9
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.850	0.95612	138.4	1.38353	95.6	0.69107	52.2	1.4470	10.9
.851	.95750	138.4	.38449	95.7	.69159	52.2	.4439	10.9
.852	.95888	138.5	.38545	95.9	.69211	52.1	.4449	10.9
.853	.96027	138.6	.38641	96.0	.69263	52.0	.4438	10.8
.854	.96166	138.7	.38737	96.2	.69315	52.0	.4427	10.8
0.855	0.96305	138.8	1.38833	96.3	0.69367	51.9	1.4416	10.8
.856	.96443	138.9	.38929	96.4	.69419	51.8	.4405	10.8
.857	.96582	139.0	.39026	96.6	.69471	51.7	.4395	10.7
.858	.96721	139.1	.39122	96.7	.69523	51.7	.4384	10.7
.859	.96861	139.2	.39219	96.9	.69574	51.6	.4373	10.7
0.860	0.97000	139.3	1.39316	97.0	0.69626	51.5	1.4362	10.6
.861	.97139	139.4	.39413	97.1	.69677	51.5	.4352	10.6
.862	.97279	139.5	.39510	97.3	.69729	51.4	.4341	10.6
.863	.97418	139.6	.39608	97.4	.69780	51.3	.4331	10.5
.864	.97558	139.7	.39705	97.6	.69831	51.2	.4320	10.5
0.865	0.97698	139.8	1.39803	97.7	0.69882	51.2	1.4310	10.5
.866	.97838	139.9	.39901	97.8	.69934	51.1	.4299	10.4
.867	.97978	140.0	.39999	98.0	.69985	51.0	.4289	10.4
.868	.98118	140.1	.40097	98.1	.70036	51.0	.4278	10.4
.869	.98258	140.2	.40195	98.3	.70087	50.9	.4268	10.4
0.870	0.98398	140.3	1.40293	98.4	0.70137	50.8	1.4258	10.3
.871	.98538	140.4	.40392	98.5	.70188	50.7	.4247	10.3
.872	.98679	140.5	.40490	98.7	.70239	50.7	.4237	10.3
.873	.98819	140.6	.40589	98.8	.70290	50.6	.4227	10.2
.874	.98960	140.7	.40688	99.0	.70340	50.5	.4217	10.2
0.875	0.99101	140.8	1.40787	99.1	0.70391	50.5	1.4206	10.2
.876	.99241	140.9	.40886	99.2	.70441	50.4	.4196	10.2
.877	.99382	141.0	.40985	99.4	.70491	50.3	.4186	10.1
.878	.99523	141.1	.41085	99.5	.70542	50.2	.4176	10.1
.879	.99665	141.2	.41184	99.7	.70592	50.2	.4166	10.1
0.880	0.99806	141.3	1.41284	99.8	0.70642	50.1	1.4156	10.0
.881	.99947	141.4	.41384	99.9	.70692	50.0	.4146	10.0
.882	1.00089	141.5	.41484	100.1	.70742	50.0	.4136	10.0
.883	.00230	141.6	.41584	100.2	.70792	49.9	.4126	10.0
.884	.00372	141.7	.41684	100.4	.70842	49.8	.4116	9.9
0.885	1.00514	141.8	1.41785	100.5	0.70892	49.7	1.4106	9.9
.886	.00655	141.9	.41886	100.7	.70941	49.7	.4096	9.9
.887	.00797	142.0	.41986	100.8	.70991	49.6	.4086	9.8
.888	.00939	142.1	.42087	100.9	.71040	49.5	.4076	9.8
.889	.01081	142.2	.42188	101.1	.71090	49.5	.4067	9.8
0.890	1.01224	142.3	1.42289	101.2	0.71139	49.4	1.4057	9.8
.891	.01366	142.4	.42391	101.4	.71189	49.3	.4047	9.7
.892	.01508	142.5	.42492	101.5	.71238	49.3	.4037	9.7
.893	.01651	142.6	.42594	101.7	.71287	49.2	.4028	9.7
.894	.01794	142.7	.42695	101.8	.71336	49.1	.4018	9.7
0.895	1.01936	142.8	1.42797	101.9	0.71385	49.0	1.4008	9.6
.896	.02079	142.9	.42899	102.1	.71434	49.0	.3999	9.6
.897	.02222	143.0	.43001	102.2	.71483	48.9	.3989	9.6
.898	.02365	143.1	.43104	102.4	.71532	48.8	.3980	9.5
.899	.02508	143.2	.43206	102.5	.71581	48.8	.3970	9.5
0.900	1.02652	143.3	1.43309	102.7	0.71630	48.7	1.3961	9.5
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	sec gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.900	1.02652	1.43	1.43309	103	0.71630	.487	1.4061	9.5
.901	.02795	1.43	.43410	103	.71698	.487	.4051	9.5
.902	.02938	1.44	.43511	103	.71727	.486	.4041	9.4
.903	.03082	1.44	.43617	103	.71776	.485	.4031	9.4
.904	.03226	1.44	.43720	103	.71824	.484	.4021	9.4
0.905	1.03370	1.44	1.43824	103	0.71872	.483	1.4014	9.4
.906	.03513	1.44	.43927	104	.71921	.483	.4004	9.3
.907	.03657	1.44	.44031	104	.71969	.482	.3995	9.3
.908	.03801	1.44	.44134	104	.72017	.481	.3985	9.3
.909	.03946	1.44	.44238	104	.72065	.481	.3976	9.3
0.910	1.04090	1.44	1.44342	104	0.72113	.480	1.4067	9.2
.911	.04234	1.44	.44446	104	.72161	.479	.4058	9.2
.912	.04379	1.45	.44551	104	.72209	.479	.4049	9.2
.913	.04523	1.45	.44655	105	.72257	.478	.4040	9.2
.914	.04668	1.45	.44760	105	.72305	.477	.4030	9.1
0.915	1.04813	1.45	1.44865	105	0.72353	.477	1.4021	9.1
.916	.04958	1.45	.44969	105	.72400	.476	.4012	9.1
.917	.05103	1.45	.45075	105	.72448	.475	.4003	9.1
.918	.05248	1.45	.45180	105	.72495	.474	.3994	9.0
.919	.05393	1.45	.45285	105	.72543	.474	.3985	9.0
0.920	1.05539	1.45	1.45390	106	0.72590	.473	1.4076	9.0
.921	.05684	1.45	.45495	106	.72637	.473	.4067	9.0
.922	.05830	1.46	.45600	106	.72684	.472	.4058	8.9
.923	.05975	1.46	.45708	106	.72731	.471	.4049	8.9
.924	.06121	1.46	.45814	106	.72778	.470	.4040	8.9
0.925	1.06267	1.46	1.45920	106	0.72825	.470	1.4031	8.9
.926	.06413	1.46	.46026	106	.72872	.469	.4022	8.8
.927	.06559	1.46	.46133	107	.72919	.468	.4013	8.8
.928	.06705	1.46	.46240	107	.72966	.468	.4004	8.8
.929	.06851	1.46	.46346	107	.73013	.467	.3995	8.8
0.930	1.06998	1.46	1.46453	107	0.73059	.466	1.4087	8.7
.931	.07144	1.47	.46560	107	.73106	.466	.4078	8.7
.932	.07291	1.47	.46667	107	.73153	.465	.4069	8.7
.933	.07438	1.47	.46775	107	.73199	.464	.4060	8.7
.934	.07584	1.47	.46882	108	.73245	.464	.4051	8.6
0.935	1.07731	1.47	1.46990	108	0.73292	.463	1.4042	8.6
.936	.07878	1.47	.47098	108	.73338	.463	.4033	8.6
.937	.08026	1.47	.47206	108	.73384	.462	.4024	8.6
.938	.08173	1.47	.47314	108	.73430	.461	.4015	8.5
.939	.08320	1.47	.47422	108	.73476	.460	.4006	8.5
0.940	1.08468	1.48	1.47530	108	0.73522	.459	1.4097	8.5
.941	.08615	1.48	.47639	109	.73568	.459	.4088	8.5
.942	.08763	1.48	.47748	109	.73614	.458	.4079	8.5
.943	.08911	1.48	.47857	109	.73660	.457	.4070	8.4
.944	.09059	1.48	.47966	109	.73705	.457	.4061	8.4
0.945	1.09207	1.48	1.48075	109	0.73751	.456	1.4052	8.4
.946	.09355	1.48	.48184	109	.73797	.455	.4043	8.4
.947	.09503	1.48	.48293	110	.73842	.455	.4034	8.3
.948	.09651	1.48	.48403	110	.73888	.454	.4025	8.3
.949	.09800	1.49	.48513	110	.73933	.453	.4016	8.3
0.950	1.09948	1.49	1.48623	110	0.73978	.453	1.4007	8.3
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
0.950	1.09048	149	1.48623	110	0.73978	45.3	1.3517	8.3
.951	1.09097	149	.48733	110	.74024	45.2	.3509	8.2
.952	1.09140	149	.48843	110	.74069	45.1	.3501	8.2
.953	1.09185	149	.48953	110	.74114	45.1	.3493	8.2
.954	1.09234	149	.49064	111	.74159	45.0	.3485	8.2
0.955	1.10203	149	1.49174	111	0.74204	44.9	1.3476	8.2
.956	1.0842	149	.49285	111	.74249	44.9	.3468	8.1
.957	1.09091	149	.49396	111	.74294	44.8	.3460	8.1
.958	1.11141	150	.49507	111	.74338	44.7	.3452	8.1
.959	1.11391	150	.49618	111	.74383	44.7	.3444	8.1
0.960	1.11440	150	1.49729	111	0.74428	44.6	1.3436	8.1
.961	1.11590	150	.49841	112	.74472	44.5	.3428	8.0
.962	1.11740	150	.49953	112	.74517	44.5	.3420	8.0
.963	1.11890	150	.50064	112	.74561	44.4	.3412	8.0
.964	1.12040	150	.50176	112	.74606	44.3	.3404	8.0
0.965	1.12190	150	1.50289	112	0.74650	44.3	1.3396	7.9
.966	1.12341	150	.50401	112	.74694	44.2	.3388	7.9
.967	1.12491	151	.50513	112	.74738	44.1	.3380	7.9
.968	1.12642	151	.50626	113	.74782	44.1	.3372	7.9
.969	1.12793	151	.50739	113	.74826	44.0	.3364	7.9
0.970	1.12943	151	1.50851	113	0.74870	43.9	1.3356	7.8
.971	1.13094	151	.50964	113	.74914	43.9	.3349	7.8
.972	1.13245	151	.51078	113	.74958	43.8	.3341	7.8
.973	1.13396	151	.51191	113	.75002	43.7	.3333	7.8
.974	1.13547	151	.51304	114	.75046	43.7	.3325	7.8
0.975	1.13699	151	1.51418	114	0.75089	43.6	1.3317	7.7
.976	1.13850	152	.51532	114	.75133	43.6	.3310	7.7
.977	1.14002	152	.51646	114	.75176	43.5	.3302	7.7
.978	1.14154	152	.51760	114	.75220	43.4	.3294	7.7
.979	1.14305	152	.51874	114	.75263	43.4	.3287	7.7
0.980	1.14457	152	1.51988	114	0.75307	43.3	1.3279	7.6
.981	1.14609	152	.52103	115	.75350	43.2	.3271	7.6
.982	1.14760	152	.52218	115	.75393	43.2	.3264	7.6
.983	1.14911	152	.52332	115	.75436	43.1	.3256	7.6
.984	1.15066	152	.52447	115	.75479	43.0	.3249	7.6
0.985	1.15219	153	1.52563	115	0.75522	43.0	1.3241	7.5
.986	1.15371	153	.52678	115	.75566	42.9	.3234	7.5
.987	1.15524	153	.52793	116	.75608	42.8	.3226	7.5
.988	1.15677	153	.52909	116	.75651	42.8	.3219	7.5
.989	1.15830	153	.53025	116	.75694	42.7	.3211	7.5
0.990	1.15983	153	1.53141	116	0.75736	42.6	1.3204	7.4
.991	1.16136	153	.53257	116	.75779	42.6	.3196	7.4
.992	1.16289	153	.53373	116	.75821	42.5	.3189	7.4
.993	1.16443	153	.53489	116	.75864	42.4	.3182	7.4
.994	1.16596	154	.53606	117	.75906	42.4	.3174	7.4
0.995	1.16750	154	1.53722	117	0.75949	42.3	1.3167	7.3
.996	1.16904	154	.53839	117	.75991	42.3	.3159	7.3
.997	1.17058	154	.53956	117	.76033	42.2	.3152	7.3
.998	1.17212	154	.54073	117	.76075	42.1	.3145	7.3
.999	1.17366	154	.54191	117	.76117	42.1	.3138	7.3
1.000	1.17520	154	1.54308	118	0.76159	42.0	1.3130	7.2
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.000	1.17520	151	1.54308	118	0.76159	42.0	1.3130	7.2
.001	.17074	151	.54126	118	.76201	41.9	.3123	7.2
.002	.17829	155	.54513	118	.76243	41.9	.3116	7.2
.003	.17981	155	.54684	118	.76285	41.8	.3109	7.2
.004	.18133	155	.54779	118	.76327	41.7	.3102	7.2
1.005	1.18203	155	1.54898	118	0.76359	41.7	1.3094	7.1
.006	.18448	155	.55010	118	.76410	41.6	.3087	7.1
.007	.18603	155	.55131	119	.76452	41.6	.3080	7.1
.008	.18758	155	.55253	119	.76493	41.5	.3073	7.1
.009	.18914	155	.55372	119	.76535	41.4	.3066	7.1
1.010	1.19069	155	1.55491	119	0.76576	41.4	1.3059	7.1
.011	.19225	150	.55610	119	.76618	41.3	.3052	7.0
.012	.19380	156	.55729	119	.76659	41.2	.3045	7.0
.013	.19536	156	.55849	120	.76700	41.2	.3038	7.0
.014	.19692	156	.55969	120	.76741	41.1	.3031	7.0
1.015	1.19848	156	1.56088	120	0.76782	41.0	1.3024	7.0
.016	.20004	156	.56208	120	.76823	41.0	.3017	6.9
.017	.20160	156	.56328	120	.76864	40.9	.3010	6.9
.018	.20317	156	.56449	120	.76905	40.9	.3003	6.9
.019	.20473	157	.56569	120	.76946	40.8	.3000	6.9
1.020	1.20630	157	1.56689	121	0.76987	40.7	1.3000	6.9
.021	.20787	157	.56810	121	.77027	40.7	.3000	6.9
.022	.20944	157	.56931	121	.77068	40.6	.3000	6.8
.023	.21101	157	.57052	121	.77109	40.5	.3000	6.8
.024	.21258	157	.57173	121	.77149	40.5	.3000	6.8
1.025	1.21415	157	1.57295	121	0.77190	40.4	1.2995	6.8
.026	.21572	157	.57416	122	.77230	40.4	.3018	6.8
.027	.21730	158	.57538	122	.77270	40.3	.3012	6.7
.028	.21887	158	.57660	122	.77310	40.2	.3015	6.7
.029	.22045	158	.57782	122	.77351	40.2	.3028	6.7
1.030	1.22203	158	1.57904	122	0.77391	40.1	1.3001	6.7
.031	.22361	158	.58026	122	.77431	40.0	.3015	6.7
.032	.22519	158	.58148	123	.77471	40.0	.3008	6.7
.033	.22677	158	.58271	123	.77511	39.9	.3001	6.6
.034	.22836	158	.58394	123	.77551	39.9	.3005	6.6
1.035	1.22994	159	1.58517	123	0.77591	39.8	1.3000	6.6
.036	.23153	159	.58640	123	.77630	39.7	.3000	6.6
.037	.23311	159	.58763	123	.77670	39.7	.3000	6.6
.038	.23470	159	.58886	123	.77710	39.6	.3000	6.6
.039	.23629	159	.59010	124	.77749	39.6	.3000	6.5
1.040	1.23788	159	1.59134	124	0.77789	39.5	1.2995	6.5
.041	.23947	159	.59257	124	.77828	39.4	.3000	6.5
.042	.24107	159	.59381	124	.77868	39.4	.3000	6.5
.043	.24266	160	.59506	124	.77907	39.3	.3000	6.5
.044	.24426	160	.59630	124	.77946	39.2	.3000	6.5
1.045	1.24585	160	1.59755	125	0.77985	39.2	1.2982	6.4
.046	.24745	160	.59879	125	.78025	39.1	.3000	6.4
.047	.24905	160	.60004	125	.78064	39.1	.3000	6.4
.048	.25065	160	.60129	125	.78103	39.0	.3000	6.4
.049	.25225	160	.60254	125	.78142	38.9	.3000	6.4
1.050	1.25386	160	1.60379	125	0.78181	38.9	1.2991	6.4
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	sec gd u	$\omega F_0'$

SMITHSONIAN TABLES

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
I.050	1.25386	160	1.60379	125	0.78181	38.9	1.2791	6.4
.051	.25546	161	.60505	126	.78219	38.8	.2785	6.3
.052	.25707	161	.60631	126	.78258	38.8	.2778	6.3
.053	.25867	161	.60756	126	.78297	38.7	.2772	6.3
.054	.26028	161	.60882	126	.78336	38.6	.2766	6.3
I.055	1.26180	161	1.61008	126	0.78374	38.6	1.2759	6.3
.056	.26350	161	.61135	126	.78413	38.5	.2753	6.3
.057	.26511	161	.61261	127	.78451	38.4	.2747	6.2
.058	.26673	161	.61388	127	.78490	38.4	.2741	6.2
.059	.26834	162	.61514	127	.78528	38.3	.2734	6.2
I.060	1.26996	162	1.61641	127	0.78566	38.3	1.2728	6.2
.061	.27157	162	.61768	127	.78605	38.2	.2722	6.2
.062	.27319	162	.61896	127	.78643	38.2	.2716	6.2
.063	.27481	162	.62023	127	.78681	38.1	.2710	6.2
.064	.27643	162	.62151	128	.78719	38.0	.2703	6.1
I.065	1.27806	162	1.62278	128	0.78757	38.0	1.2697	6.1
.066	.27968	162	.62406	128	.78795	37.9	.2691	6.1
.067	.28130	163	.62534	128	.78833	37.9	.2685	6.1
.068	.28293	163	.62662	128	.78871	37.8	.2679	6.1
.069	.28456	163	.62791	128	.78908	37.7	.2673	6.1
I.070	1.28519	163	1.62919	129	0.78946	37.7	1.2667	6.0
.071	.28782	163	.63048	129	.78984	37.6	.2661	6.0
.072	.28945	163	.63177	129	.79021	37.6	.2655	6.0
.073	.29108	163	.63306	129	.79059	37.5	.2649	6.0
.074	.29271	163	.63435	129	.79096	37.4	.2643	6.0
I.075	1.29435	164	1.63565	129	0.79134	37.4	1.2637	6.0
.076	.29598	164	.63694	130	.79171	37.3	.2631	6.0
.077	.29762	164	.63824	130	.79208	37.3	.2625	5.9
.078	.29926	164	.63954	130	.79246	37.2	.2619	5.9
.079	.30090	164	.64084	130	.79283	37.1	.2613	5.9
I.080	1.30254	164	1.64214	130	0.79320	37.1	1.2607	5.9
.081	.30418	164	.64344	130	.79357	37.0	.2601	5.9
.082	.30583	164	.64475	131	.79394	37.0	.2595	5.9
.083	.30747	165	.64605	131	.79431	36.9	.2590	5.8
.084	.30912	165	.64736	131	.79468	36.8	.2584	5.8
I.085	1.31077	165	1.64857	131	0.79505	36.8	1.2578	5.8
.086	.31242	165	.64998	131	.79541	36.7	.2572	5.8
.087	.31407	165	.65130	131	.79578	36.7	.2566	5.8
.088	.31572	165	.65261	132	.79615	36.6	.2560	5.8
.089	.31737	165	.65393	132	.79651	36.6	.2555	5.8
I.090	1.31903	166	1.65525	132	0.79688	36.5	1.2549	5.7
.091	.32068	166	.65657	132	.79724	36.4	.2543	5.7
.092	.32234	166	.65789	132	.79761	36.4	.2538	5.7
.093	.32400	166	.65921	132	.79797	36.3	.2532	5.7
.094	.32566	166	.66053	133	.79833	36.3	.2526	5.7
I.095	1.32732	166	1.66186	133	0.79870	36.2	1.2520	5.7
.096	.32898	166	.66319	133	.79906	36.2	.2515	5.7
.097	.33065	166	.66452	133	.79942	36.1	.2509	5.6
.098	.33231	167	.66585	133	.79978	36.0	.2503	5.6
.099	.33398	167	.66718	133	.80014	36.0	.2498	5.6
I.100	1.33565	167	1.66852	134	0.80050	35.9	1.2492	5.6
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	csc u	$\omega F_0'$



Natural Hyperbolic Functions.

u	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$	tanh u	$\infty F_0'$	coth u	$\infty F_0'$
1.100	1.33565	167	1.66852	134	0.80050	35.9	1.2401	5.6
.101	.33732	167	.66986	134	.80081	35.9	.2407	5.6
.102	.33899	167	.67119	134	.80122	35.8	.24131	5.6
.103	.34066	167	.67253	134	.80157	35.7	.24175	5.6
.104	.34233	167	.67387	134	.80193	35.7	.2420	5.5
1.105	1.34401	168	1.67522	134	0.80229	35.6	1.2464	5.5
.105	.34568	168	.67656	135	.80264	35.6	.2459	5.5
.107	.34736	168	.67791	135	.80300	35.5	.2453	5.5
.108	.34904	168	.67926	135	.80335	35.5	.2448	5.5
.109	.35072	168	.68061	135	.80371	35.4	.2442	5.5
1.110	1.35240	168	1.68195	135	0.80406	35.3	1.2437	5.5
.111	.35408	168	.68331	135	.80442	35.3	.2431	5.5
.112	.35577	168	.68467	136	.80477	35.2	.2426	5.4
.113	.35745	169	.68602	136	.80512	35.2	.2421	5.4
.114	.35914	169	.68738	136	.80547	35.1	.2415	5.4
1.115	1.36083	169	1.68874	136	0.80582	35.1	1.2410	5.4
.116	.36252	169	.69010	136	.80617	35.0	.2404	5.4
.117	.36421	169	.69147	136	.80652	35.0	.2399	5.4
.118	.36590	169	.69283	137	.80687	34.9	.2394	5.4
.119	.36759	169	.69420	137	.80722	34.8	.2388	5.3
1.120	1.36929	170	1.69557	137	0.80757	34.8	1.2383	5.3
.121	.37098	170	.69694	137	.80792	34.7	.2378	5.3
.122	.37268	170	.69831	137	.80826	34.7	.2372	5.3
.123	.37438	170	.69968	137	.80861	34.6	.2367	5.3
.124	.37608	170	.70105	138	.80896	34.6	.2362	5.3
1.125	1.37778	170	1.70243	138	0.80930	34.5	1.2356	5.3
.126	.37949	170	.70381	138	.80965	34.4	.2351	5.3
.127	.38119	171	.70519	138	.80999	34.4	.2346	5.2
.128	.38290	171	.70658	138	.81033	34.3	.2341	5.2
.129	.38460	171	.70795	138	.81068	34.3	.2335	5.2
1.130	1.38631	171	1.70931	139	0.81102	34.2	1.2330	5.2
.131	.38802	171	.71073	139	.81136	34.2	.2325	5.2
.132	.38973	171	.71212	139	.81170	34.1	.2320	5.2
.133	.39145	171	.71351	139	.81204	34.1	.2315	5.2
.134	.39316	171	.71490	139	.81238	34.0	.2309	5.2
1.135	1.39488	172	1.71630	139	0.81272	33.9	1.2304	5.1
.136	.39659	172	.71769	140	.81305	33.9	.2299	5.1
.137	.39831	172	.71909	140	.81340	33.8	.2294	5.1
.138	.39993	172	.72049	140	.81374	33.8	.2289	5.1
.139	.40175	172	.72189	140	.81408	33.7	.2284	5.1
1.140	1.40317	172	1.72329	140	0.81441	33.7	1.2279	5.1
.141	.40520	172	.72470	141	.81475	33.6	.2274	5.1
.142	.40692	173	.72610	141	.81509	33.6	.2269	5.1
.143	.40865	173	.72751	141	.81542	33.5	.2264	5.0
.144	.41038	173	.72892	141	.81576	33.5	.2259	5.0
1.145	1.41211	173	1.73033	141	0.81609	33.4	1.2254	5.0
.146	.41384	173	.73175	141	.81642	33.3	.2249	5.0
.147	.41557	173	.73316	142	.81676	33.3	.2244	5.0
.148	.41731	173	.73458	142	.81709	33.2	.2239	5.0
.149	.41904	174	.73599	142	.81742	33.2	.2234	5.0
1.150	1.43078	174	1.73741	142	0.81775	33.1	1.2229	5.0
u	tanh u	$\infty F_0'$	sech u	$\infty F_0'$	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
1.150	1.42028	174	1.73741	142	0.81775	33.1	1.2220	5.0
.151	1.42252	174	1.73894	142	.81809	33.1	.2221	4.9
.152	1.42476	174	1.74026	142	.81842	33.0	.2219	4.9
.153	1.42699	174	1.74168	143	.81875	33.0	.2214	4.9
.154	1.42924	174	1.74311	143	.81907	32.9	.2209	4.9
1.155	1.43148	174	1.74454	143	0.81940	32.9	1.2204	4.9
.156	1.43373	175	1.74597	143	.81973	32.8	.2199	4.9
.157	1.43597	175	1.74740	143	.82006	32.8	.2194	4.9
.158	1.43822	175	1.74884	143	.82039	32.7	.2188	4.9
.159	1.44047	175	1.75027	144	.82071	32.6	.2185	4.8
1.160	1.44272	175	1.75171	144	0.82104	32.6	1.2180	4.8
.161	1.44496	175	1.75315	144	.82137	32.5	.2175	4.8
.162	1.44721	175	1.75459	144	.82169	32.5	.2170	4.8
.163	1.44946	176	1.75603	144	.82202	32.4	.2165	4.8
.164	1.45170	176	1.75748	145	.82234	32.4	.2160	4.8
1.165	1.45395	176	1.75892	145	0.82266	32.3	1.2156	4.8
.166	1.45620	176	1.76037	145	.82299	32.3	.2151	4.8
.167	1.45845	176	1.76182	145	.82331	32.2	.2146	4.8
.168	1.46069	176	1.76327	145	.82363	32.2	.2141	4.7
.169	1.46294	176	1.76472	145	.82395	32.1	.2137	4.7
1.170	1.46519	177	1.76618	146	0.82427	32.1	1.2132	4.7
.171	1.46743	177	1.76761	146	.82459	32.0	.2127	4.7
.172	1.46968	177	1.76906	146	.82491	32.0	.2123	4.7
.173	1.47193	177	1.77050	146	.82523	31.9	.2118	4.7
.174	1.47417	177	1.77202	146	.82555	31.8	.2113	4.7
1.175	1.47642	177	1.77348	146	0.82587	31.8	1.2108	4.7
.176	1.47867	177	1.77495	147	.82619	31.7	.2104	4.7
.177	1.48091	178	1.77641	147	.82650	31.7	.2099	4.6
.178	1.48316	178	1.77788	147	.82682	31.6	.2095	4.6
.179	1.48541	178	1.77935	147	.82714	31.6	.2090	4.6
1.180	1.48766	178	1.78083	147	0.82745	31.5	1.2085	4.6
.181	1.48990	178	1.78230	148	.82777	31.5	.2081	4.6
.182	1.49215	178	1.78378	148	.82808	31.4	.2076	4.6
.183	1.49440	179	1.78525	148	.82840	31.4	.2072	4.6
.184	1.49664	179	1.78673	148	.82871	31.3	.2067	4.6
1.185	1.49889	179	1.78822	148	0.82902	31.3	1.2062	4.6
.186	1.50114	179	1.78970	148	.82933	31.2	.2058	4.5
.187	1.50338	179	1.79119	149	.82965	31.2	.2053	4.5
.188	1.50563	179	1.79267	149	.82996	31.1	.2049	4.5
.189	1.50788	179	1.79416	149	.83027	31.1	.2044	4.5
1.190	1.51013	180	1.79565	149	0.83058	31.0	1.2040	4.5
.191	1.51237	180	1.79714	149	.83089	31.0	.2035	4.5
.192	1.51462	180	1.79864	150	.83120	30.9	.2031	4.5
.193	1.51687	180	1.80013	150	.83151	30.9	.2026	4.5
.194	1.51911	180	1.80163	150	.83182	30.8	.2022	4.5
1.195	1.52136	180	1.80313	150	0.83212	30.8	1.2017	4.4
.196	1.52361	180	1.80463	150	.83243	30.7	.2013	4.4
.197	1.52585	181	1.80614	150	.83274	30.7	.2009	4.4
.198	1.52810	181	1.80764	151	.83304	30.6	.2004	4.4
.199	1.53035	181	1.80915	151	.83335	30.6	.2000	4.4
1.200	1.53260	181	1.81066	151	0.83365	30.5	1.1995	4.4
$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	lnah u	$\omega F_0'$	coth u	$\omega F_0'$
1.200	1.50946	181	1.81066	151	0.83395	30.5	1.1995	4.1
.201	.51127	181	.81217	151	.83396	30.5	.1001	4.1
.202	.51309	181	.81368	151	.83426	30.4	.1087	4.1
.203	.51490	182	.81519	151	.83457	30.3	.1082	4.1
.204	.51672	182	.81671	152	.83487	30.3	.1078	4.3
1.205	1.51853	182	1.81823	152	0.83517	30.2	1.1074	4.3
.206	.52035	182	.81974	152	.83548	30.2	.1060	4.3
.207	.52217	182	.82127	152	.83578	30.1	.1055	4.3
.208	.52400	182	.82279	152	.83608	30.1	.1051	4.3
.209	.52582	182	.82431	153	.83638	30.0	.1056	4.3
1.210	1.52764	183	1.82584	153	0.83668	30.0	1.1052	4.3
.211	.52947	183	.82737	153	.83698	29.9	.1048	4.3
.212	.53130	183	.82890	153	.83728	29.9	.1043	4.3
.213	.53313	183	.83043	153	.83758	29.8	.1039	4.3
.214	.53496	183	.83197	153	.83788	29.8	.1035	4.3
1.215	1.53679	183	1.83350	154	0.83817	29.7	1.1031	4.2
.216	.53863	184	.83504	154	.83847	29.7	.1026	4.2
.217	.54046	184	.83658	154	.83877	29.6	.1022	4.2
.218	.54230	184	.83812	154	.83906	29.6	.1018	4.2
.219	.54414	184	.83966	154	.83936	29.5	.1014	4.2
1.220	1.54598	184	1.84121	155	0.83965	29.5	1.1010	4.2
.221	.54782	184	.84276	155	.83995	29.4	.1005	4.1
.222	.54966	184	.84430	155	.84024	29.4	.1001	4.2
.223	.55151	185	.84586	155	.84054	29.3	.1007	4.2
.224	.55336	185	.84741	155	.84083	29.3	.1003	4.1
1.225	1.55520	185	1.84896	156	0.84112	29.3	1.1000	4.1
.226	.55705	185	.85052	156	.84142	29.2	.1005	4.1
.227	.55890	185	.85208	156	.84171	29.2	.1001	4.1
.228	.56076	185	.85364	156	.84200	29.1	.1007	4.1
.229	.56261	186	.85520	156	.84229	29.1	.1003	4.1
1.230	1.56447	186	1.85676	156	0.84258	29.0	1.1000	4.1
.231	.56633	186	.85833	157	.84287	29.0	.1004	4.1
.232	.56819	186	.85989	157	.84316	28.9	.1000	4.1
.233	.57005	186	.86146	157	.84345	28.9	.1005	4.1
.234	.57191	186	.86303	157	.84374	28.8	.1001	4.1
1.235	1.57377	186	1.86461	157	0.84402	28.8	1.1000	4.0
.236	.57564	187	.86618	158	.84431	28.7	.1004	4.0
.237	.57750	187	.86776	158	.84460	28.7	.1000	4.0
.238	.57937	187	.86934	158	.84488	28.6	.1005	4.0
.239	.58124	187	.87092	158	.84517	28.6	.1001	4.0
1.240	1.58311	187	1.87250	158	0.84546	28.5	1.1000	4.0
.241	.58499	187	.87408	158	.84574	28.5	.1004	4.0
.242	.58686	188	.87567	159	.84602	28.4	.1000	4.0
.243	.58874	188	.87726	159	.84631	28.4	.1005	4.0
.244	.59062	188	.87885	159	.84659	28.3	.1001	4.0
1.245	1.59250	188	1.88044	159	0.84688	28.3	1.1000	3.9
.246	.59438	188	.88203	159	.84716	28.2	.1004	3.9
.247	.59626	188	.88363	160	.84744	28.2	.1000	3.9
.248	.59815	189	.88522	160	.84772	28.1	.1005	3.9
.249	.60003	189	.88682	160	.84800	28.1	.1001	3.9
1.250	1.60192	189	1.88842	160	0.84828	28.0	1.1000	3.9
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.250	1.60192	189	1.88842	160	0.84828	28.0	1.1789	3.9
.251	.60381	189	.89003	160	.84856	28.0	.1785	3.9
.252	.60570	189	.89163	161	.84884	27.9	.1781	3.9
.253	.60759	189	.89324	161	.84912	27.9	.1777	3.9
.254	.60949	189	.89485	161	.84940	27.9	.1773	3.9
1.255	1.61138	190	1.89646	161	0.84968	27.8	1.1769	3.9
.256	.61328	190	.89807	161	.84996	27.8	.1765	3.8
.257	.61518	190	.89968	162	.85023	27.7	.1761	3.8
.258	.61708	190	.90130	162	.85051	27.7	.1758	3.8
.259	.61898	190	.90292	162	.85079	27.6	.1754	3.8
1.260	1.62088	190	1.90454	162	0.85106	27.6	1.1750	3.8
.261	.62279	191	.90616	162	.85134	27.5	.1746	3.8
.262	.62470	191	.90778	162	.85161	27.5	.1742	3.8
.263	.62661	191	.90941	163	.85189	27.4	.1739	3.8
.264	.62851	191	.91104	163	.85216	27.4	.1735	3.8
1.265	1.63043	191	1.91267	163	0.85244	27.3	1.1731	3.8
.266	.63234	191	.91430	163	.85271	27.3	.1727	3.8
.267	.63426	192	.91593	163	.85298	27.2	.1724	3.7
.268	.63617	192	.91757	164	.85325	27.2	.1720	3.7
.269	.63809	192	.91920	164	.85353	27.1	.1716	3.7
1.270	1.64001	192	1.92081	164	0.85380	27.1	1.1712	3.7
.271	.64193	192	.92248	164	.85407	27.1	.1709	3.7
.272	.64385	192	.92413	164	.85434	27.0	.1705	3.7
.273	.64578	193	.92577	165	.85461	27.0	.1701	3.7
.274	.64771	193	.92742	165	.85488	26.9	.1698	3.7
1.275	1.64964	193	1.92907	165	0.85515	26.9	1.1694	3.7
.276	.65157	193	.93072	165	.85542	26.8	.1690	3.7
.277	.65350	193	.93237	165	.85568	26.8	.1687	3.7
.278	.65543	193	.93402	166	.85595	26.7	.1683	3.6
.279	.65736	194	.93568	166	.85622	26.7	.1679	3.6
1.280	1.65930	194	1.93734	166	0.85648	26.6	1.1676	3.6
.281	.66124	194	.93900	166	.85675	26.6	.1672	3.6
.282	.66318	194	.94066	166	.85702	26.6	.1668	3.6
.283	.66512	194	.94233	167	.85728	26.5	.1665	3.6
.284	.66706	194	.94399	167	.85755	26.5	.1661	3.6
1.285	1.66901	195	1.94566	167	0.85781	26.4	1.1658	3.6
.286	.67096	195	.94733	167	.85808	26.4	.1654	3.6
.287	.67290	195	.94900	167	.85834	26.3	.1650	3.6
.288	.67485	195	.95068	167	.85860	26.3	.1647	3.6
.289	.67680	195	.95235	168	.85886	26.2	.1643	3.6
1.290	1.67876	195	1.95403	168	0.85913	26.2	1.1640	3.5
.291	.68071	196	.95571	168	.85939	26.1	.1636	3.5
.292	.68267	196	.95739	168	.85965	26.1	.1633	3.5
.293	.68463	196	.95907	168	.85991	26.1	.1629	3.5
.294	.68659	196	.96076	169	.86017	26.0	.1626	3.5
1.295	1.68855	196	1.96245	169	0.86043	26.0	1.1622	3.5
.296	.69051	196	.96414	169	.86069	25.9	.1619	3.5
.297	.69248	197	.96583	169	.86095	25.9	.1615	3.5
.298	.69444	197	.96752	169	.86121	25.8	.1612	3.5
.299	.69641	197	.96922	170	.86147	25.8	.1608	3.5
1.300	1.69838	197	1.97091	170	0.86172	25.7	1.1605	3.5
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
1.300	1.69838	197	1.97091	170	0.86172	25.7	1.1605	3.5
.301	.70035	197	.97261	170	.86168	25.7	1.1604	3.5
.302	.70233	197	.97431	170	.86164	25.7	1.1603	3.5
.303	.70430	198	.97602	170	.86160	25.6	1.1601	3.4
.304	.70628	198	.97772	171	.86157	25.6	1.1601	3.4
1.305	1.70826	198	1.97943	171	0.86153	25.6	1.1587	3.4
.306	.71024	198	.98114	171	.86149	25.6	1.1584	3.4
.307	.71222	198	.98285	171	.86145	25.4	1.1581	3.4
.308	.71420	198	.98456	171	.86142	25.4	1.1577	3.4
.309	.71619	199	.98628	172	.86138	25.3	1.1574	3.4
1.310	1.71818	199	1.98800	172	0.86134	25.3	1.1570	3.4
.311	.72017	199	.98972	172	.86131	25.3	1.1567	3.4
.312	.72216	199	.99144	172	.86127	25.2	1.1564	3.4
.313	.72415	199	.99316	172	.86123	25.2	1.1560	3.4
.314	.72614	199	.99489	173	.86120	25.1	1.1557	3.4
1.315	1.72814	200	1.99661	173	0.86116	25.1	1.1554	3.3
.316	.73014	200	.99834	173	.86112	25.0	1.1550	3.3
.317	.73214	200	2.00007	173	.86108	25.0	1.1547	3.3
.318	.73414	200	.00181	173	.86105	25.0	1.1544	3.3
.319	.73614	200	.00354	174	.86101	24.9	1.1540	3.3
1.320	1.73814	201	2.00528	174	0.86097	24.9	1.1537	3.3
.321	.74015	201	.00702	174	.86093	24.8	1.1534	3.3
.322	.74216	201	.00876	174	.86089	24.8	1.1530	3.3
.323	.74417	201	.01050	174	.86085	24.7	1.1527	3.3
.324	.74618	201	.01225	175	.86081	24.7	1.1524	3.3
1.325	1.74819	201	2.01399	175	0.86077	24.7	1.1520	3.3
.326	.75021	202	.01571	175	.86073	24.6	1.1517	3.3
.327	.75222	202	.01749	175	.86069	24.6	1.1514	3.3
.328	.75424	202	.01925	175	.86065	24.5	1.1511	3.2
.329	.75626	202	.02100	176	.86061	24.5	1.1507	3.2
1.330	1.75828	202	2.02276	176	0.86057	24.4	1.1504	3.2
.331	.76031	202	.02452	176	.86053	24.4	1.1501	3.2
.332	.76233	203	.02628	176	.86049	24.4	1.1498	3.2
.333	.76436	203	.02804	176	.86045	24.3	1.1495	3.2
.334	.76639	203	.02981	177	.86041	24.3	1.1491	3.2
1.335	1.76842	203	2.03158	177	0.86037	24.2	1.1488	3.2
.336	.77045	203	.03335	177	.86033	24.2	1.1485	3.2
.337	.77249	204	.03512	177	.86029	24.1	1.1481	3.2
.338	.77452	204	.03689	177	.86025	24.1	1.1478	3.2
.339	.77656	204	.03867	178	.86021	24.1	1.1475	3.2
1.340	1.77860	204	2.04041	178	0.86017	24.0	1.1472	3.2
.341	.78064	204	.04222	178	.86013	24.0	1.1469	3.2
.342	.78268	204	.04401	178	.86009	23.9	1.1466	3.1
.343	.78473	205	.04579	178	.86005	23.9	1.1463	3.1
.344	.78677	205	.04758	179	.86001	23.9	1.1460	3.1
1.345	1.78882	205	2.04936	179	0.86000	23.8	1.1456	3.1
.346	.79087	205	.05115	179	.86000	23.8	1.1453	3.1
.347	.79293	205	.05294	179	.86000	23.7	1.1450	3.1
.348	.79498	205	.05474	179	.86000	23.7	1.1447	3.1
.349	.79704	206	.05653	180	.86000	23.6	1.1444	3.1
1.350	1.79909	206	2.05833	180	0.86000	23.6	1.1441	3.1
$u$	$\lnn u$	$\omega F_0'$	$\sec u$	$\omega F_0'$	$\sin u$	$\omega F_0'$	$\csc u$	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.350	1.79909	206	2.05833	180	0.87405	23.6	1.1441	3.1
.351	.80115	206	.06013	180	.87429	23.6	.1438	3.1
.352	.80321	206	.06194	180	.87452	23.5	.1435	3.1
.353	.80528	205	.06374	181	.87476	23.5	.1432	3.1
.354	.80734	207	.06555	181	.87499	23.4	.1429	3.1
1.355	1.80941	207	2.06735	181	0.87523	23.4	1.1426	3.1
.356	.81148	207	.06916	181	.87546	23.4	.1423	3.0
.357	.81355	207	.07098	181	.87570	23.3	.1419	3.0
.358	.81562	207	.07279	182	.87593	23.3	.1416	3.0
.359	.81769	207	.07461	182	.87616	23.2	.1413	3.0
1.360	1.81977	208	2.07643	182	0.87639	23.2	1.1410	3.0
.361	.82184	208	.07825	182	.87662	23.2	.1407	3.0
.362	.82392	208	.08007	182	.87685	23.1	.1404	3.0
.363	.82600	208	.08190	183	.87709	23.1	.1401	3.0
.364	.82809	208	.08372	183	.87732	23.0	.1398	3.0
1.365	1.83017	209	2.08555	183	0.87755	23.0	1.1395	3.0
.366	.83226	209	.08738	183	.87778	23.0	.1392	3.0
.367	.83435	209	.08922	183	.87801	22.9	.1389	3.0
.368	.83644	209	.09105	184	.87824	22.9	.1386	3.0
.369	.83853	209	.09289	184	.87846	22.8	.1384	3.0
1.370	1.84062	209	2.09473	184	0.87869	22.8	1.1381	3.0
.371	.84272	210	.09657	184	.87892	22.7	.1378	2.9
.372	.84482	210	.09841	184	.87915	22.7	.1375	2.9
.373	.84691	210	.10026	185	.87937	22.7	.1372	2.9
.374	.84902	210	.10211	185	.87960	22.6	.1369	2.9
1.375	1.85112	210	2.10396	185	0.87983	22.6	1.1366	2.9
.376	.85322	211	.10581	185	.88005	22.6	.1363	2.9
.377	.85533	211	.10766	186	.88028	22.5	.1360	2.9
.378	.85744	211	.10952	186	.88050	22.5	.1357	2.9
.379	.85955	211	.11138	186	.88073	22.4	.1354	2.9
1.380	1.86166	211	2.11324	186	0.88095	22.4	1.1351	2.9
.381	.86378	212	.11510	186	.88117	22.4	.1348	2.9
.382	.86589	212	.11697	187	.88140	22.3	.1346	2.9
.383	.86801	212	.11883	187	.88162	22.3	.1343	2.9
.384	.87013	212	.12070	187	.88184	22.2	.1340	2.9
1.385	1.87225	212	2.12257	187	0.88207	22.2	1.1337	2.9
.386	.87437	212	.12445	187	.88229	22.2	.1334	2.8
.387	.87650	213	.12632	188	.88251	22.1	.1331	2.8
.388	.87863	213	.12820	188	.88273	22.1	.1328	2.8
.389	.88076	213	.13008	188	.88295	22.0	.1326	2.8
1.390	1.88289	213	2.13196	188	0.88317	22.0	1.1323	2.8
.391	.88502	213	.13385	189	.88339	22.0	.1320	2.8
.392	.88716	214	.13573	189	.88361	21.9	.1317	2.8
.393	.88929	214	.13762	189	.88383	21.9	.1314	2.8
.394	.89143	214	.13951	189	.88405	21.8	.1312	2.8
1.395	1.89357	214	2.14140	189	0.88427	21.8	1.1309	2.8
.396	.89571	214	.14330	190	.88448	21.8	.1306	2.8
.397	.89786	215	.14520	190	.88470	21.7	.1303	2.8
.398	.90000	215	.14709	190	.88492	21.7	.1300	2.8
.399	.90215	215	.14900	190	.88513	21.7	.1298	2.8
1.400	1.90430	215	2.15090	190	0.88535	21.6	1.1295	2.8
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$	tanh u	$\infty F_0'$	coth u	$\infty F_0'$
1.400	1.90430	215	2.15000	190	0.88535	21,6	1.1295	2,8
.401	.90645	215	.15280	191	.88557	21,6	.1292	2,8
.402	.90861	215	.15471	191	.88578	21,5	.1289	2,7
.403	.91076	216	.15662	191	.88600	21,5	.1287	2,7
.404	.91292	216	.15853	191	.88621	21,5	.1284	2,7
1.405	1.91508	216	2.16045	192	0.88643	21,4	1.1281	2,7
.406	.91724	216	.16236	192	.88664	21,4	.1279	2,7
.407	.91940	216	.16428	192	.88686	21,3	.1276	2,7
.408	.92157	217	.16620	192	.88707	21,3	.1273	2,7
.409	.92374	217	.16812	192	.88728	21,3	.1270	2,7
1.410	1.92591	217	2.17005	193	0.88749	21,2	1.1268	2,7
.411	.92808	217	.17198	193	.88771	21,2	.1265	2,7
.412	.93025	217	.17391	193	.88792	21,2	.1262	2,7
.413	.93242	218	.17584	193	.88813	21,1	.1259	2,7
.414	.93460	218	.17777	193	.88834	21,1	.1257	2,7
1.415	1.93678	218	2.17971	194	0.88855	21,0	1.1254	2,7
.416	.93896	218	.18164	194	.88876	21,0	.1252	2,7
.417	.94114	218	.18358	194	.88897	21,0	.1249	2,7
.418	.94333	219	.18553	194	.88918	20,9	.1246	2,6
.419	.94551	219	.18747	195	.88939	20,9	.1244	2,6
1.420	1.94770	219	2.18942	195	0.88960	20,9	1.1241	2,6
.421	.94989	219	.19137	195	.88981	20,8	.1238	2,6
.422	.95209	219	.19332	195	.89002	20,8	.1236	2,6
.423	.95428	220	.19527	195	.89022	20,8	.1233	2,6
.424	.95648	220	.19723	196	.89043	20,7	.1231	2,6
1.425	1.95867	220	2.19918	196	0.89064	20,7	1.1228	2,6
.426	.96087	220	.20114	196	.89084	20,6	.1225	2,6
.427	.96308	220	.20310	196	.89105	20,6	.1223	2,6
.428	.96528	221	.20507	197	.89126	20,6	.1220	2,6
.429	.96749	221	.20704	197	.89146	20,5	.1218	2,6
1.430	1.96970	221	2.20900	197	0.89167	20,5	1.1215	2,6
.431	.97191	221	.21097	197	.89187	20,5	.1212	2,6
.432	.97412	221	.21295	197	.89208	20,4	.1210	2,6
.433	.97633	221	.21492	198	.89228	20,4	.1207	2,6
.434	.97855	222	.21690	198	.89248	20,3	.1205	2,6
1.435	1.98076	222	2.21888	198	0.89269	20,3	1.1202	2,5
.436	.98298	222	.22086	198	.89289	20,3	.1200	2,5
.437	.98521	222	.22285	199	.89309	20,2	.1197	2,5
.438	.98743	222	.22483	199	.89329	20,2	.1195	2,5
.439	.98966	223	.22682	199	.89350	20,2	.1192	2,5
1.440	1.99188	223	2.22881	199	0.89370	20,1	1.1189	2,5
.441	.99411	223	.23080	199	.89390	20,1	.1187	2,5
.442	.99635	223	.23280	200	.89410	20,1	.1184	2,5
.443	.99858	223	.23480	200	.89430	20,0	.1182	2,5
.444	2.00082	224	.23680	200	.89450	20,0	.1179	2,5
1.445	2.00305	224	2.23880	200	0.89470	20,0	1.1177	2,5
.446	.00529	224	.24080	201	.89490	19,9	.1174	2,5
.447	.00753	224	.24281	201	.89510	19,9	.1172	2,5
.448	.00978	224	.24482	201	.89530	19,8	.1169	2,5
.449	.01202	225	.24683	201	.89550	19,8	.1167	2,5
1.450	2.01427	225	2.24884	201	0.89569	19,8	1.1165	2,5
u	tanh u	$\infty F_0'$	sech u	$\infty F_0'$	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$

SMITHSONIAN TABLE

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.450	2.01427	225	2.24884	201	0.89569	19.8	1.1165	2.5
.451	.01652	225	.25086	202	.89589	19.7	.1162	2.5
.452	.01877	225	.25288	202	.89609	19.7	.1160	2.5
.453	.02103	225	.25490	202	.89628	19.7	.1157	2.4
.454	.02338	226	.25692	202	.89648	19.6	.1155	2.4
1.455	2.02554	226	2.25894	203	0.89668	19.6	1.1152	2.4
.456	.02780	226	.26097	203	.89687	19.6	.1150	2.4
.457	.03006	226	.26300	203	.89707	19.5	.1147	2.4
.458	.03233	227	.26503	203	.89726	19.5	.1145	2.4
.459	.03459	227	.26706	203	.89746	19.5	.1143	2.4
1.460	2.03686	227	2.26910	204	0.89765	19.4	1.1140	2.4
.461	.03913	227	.27114	204	.89785	19.4	.1138	2.4
.462	.04140	227	.27318	204	.89804	19.4	.1135	2.4
.463	.04368	228	.27522	204	.89823	19.3	.1133	2.4
.464	.04595	228	.27726	205	.89843	19.3	.1131	2.4
1.465	2.04823	228	2.27931	205	0.89862	19.2	1.1128	2.4
.466	.05051	228	.28136	205	.89881	19.2	.1126	2.4
.467	.05280	228	.28341	205	.89900	19.2	.1123	2.4
.468	.05508	229	.28547	206	.89920	19.1	.1121	2.4
.469	.05737	229	.28752	206	.89939	19.1	.1119	2.4
1.470	2.05965	229	2.28958	206	0.89958	19.1	1.1116	2.4
.471	.06195	229	.29164	206	.89977	19.0	.1114	2.4
.472	.06424	229	.29370	206	.89996	19.0	.1112	2.3
.473	.06653	230	.29577	207	.90015	19.0	.1109	2.3
.474	.06883	230	.29784	207	.90034	18.9	.1107	2.3
1.475	2.07113	230	2.29991	207	0.90053	18.9	1.1105	2.3
.476	.07343	230	.30198	207	.90072	18.9	.1102	2.3
.477	.07573	230	.30405	208	.90090	18.8	.1100	2.3
.478	.07804	231	.30613	208	.90109	18.8	.1098	2.3
.479	.08034	231	.30821	208	.90128	18.8	.1095	2.3
1.480	2.08265	231	2.31029	208	0.90147	18.7	1.1093	2.3
.481	.08497	231	.31238	208	.90166	18.7	.1091	2.3
.482	.08728	231	.31446	209	.90184	18.7	.1088	2.3
.483	.08959	232	.31655	209	.90203	18.6	.1086	2.3
.484	.09191	232	.31864	209	.90221	18.6	.1084	2.3
1.485	2.09423	232	2.32073	209	0.90240	18.6	1.1082	2.3
.486	.09655	232	.32283	210	.90259	18.5	.1079	2.3
.487	.09888	232	.32493	210	.90277	18.5	.1077	2.3
.488	.10120	233	.32703	210	.90296	18.5	.1075	2.3
.489	.10353	233	.32913	210	.90314	18.4	.1072	2.3
1.490	2.10586	233	2.33123	211	0.90332	18.4	1.1070	2.3
.491	.10819	233	.33334	211	.90351	18.4	.1068	2.2
.492	.11053	234	.33545	211	.90369	18.3	.1066	2.2
.493	.11286	234	.33756	211	.90388	18.3	.1063	2.2
.494	.11520	234	.33968	212	.90406	18.3	.1061	2.2
1.495	2.11754	234	2.34179	212	0.90424	18.2	1.1059	2.2
.496	.11989	234	.34391	212	.90442	18.2	.1057	2.2
.497	.12223	235	.34603	212	.90460	18.2	.1055	2.2
.498	.12458	235	.34816	212	.90479	18.1	.1052	2.2
.499	.12693	235	.35028	213	.90497	18.1	.1050	2.2
1.500	2.12928	235	2.35241	213	0.90515	18.1	1.1048	2.2
u	lan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$



# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	lnb u	$\omega F_0'$	cotb u	$\omega F_0'$
1.500	2.12928	235	2.35241	213	0.90515	18.1	1.1018	2.2
.501	.13163	235	.35454	213	.90533	18.0	.1016	2.2
.502	.13309	236	.35607	213	.90551	18.0	.1014	2.2
.503	.13435	236	.35831	214	.90569	18.0	.1011	2.2
.504	.13571	236	.36095	214	.90587	17.9	.1039	2.2
1.505	2.14107	236	2.36309	214	0.90605	17.9	1.1037	2.2
.506	.14343	237	.36523	214	.90623	17.9	.1035	2.2
.507	.14580	237	.36737	215	.90641	17.8	.1033	2.2
.508	.14817	237	.36952	215	.90658	17.8	.1030	2.2
.509	.15054	237	.37167	215	.90676	17.8	.1028	2.2
1.510	2.15291	237	2.37382	215	0.90694	17.7	1.1026	2.2
.511	.15529	238	.37597	216	.90712	17.7	.1024	2.2
.512	.15766	238	.37813	216	.90729	17.7	.1022	2.1
.513	.16004	238	.38029	216	.90747	17.6	.1020	2.1
.514	.16242	238	.38245	216	.90765	17.6	.1018	2.1
1.515	2.16481	238	2.38461	216	0.90782	17.6	1.1015	2.1
.516	.16719	239	.38678	217	.90800	17.6	.1013	2.1
.517	.16958	239	.38895	217	.90817	17.5	.1011	2.1
.518	.17197	239	.39112	217	.90835	17.5	.1009	2.1
.519	.17436	239	.39329	217	.90852	17.5	.1007	2.1
1.520	2.17676	240	2.39547	218	0.90870	17.4	1.1005	2.1
.521	.17915	240	.39765	218	.90887	17.4	.1003	2.1
.522	.18155	240	.39983	218	.90905	17.4	.1001	2.1
.523	.18395	240	.40201	218	.90922	17.3	.0998	2.1
.524	.18636	240	.40419	219	.90939	17.3	.0996	2.1
1.525	2.18876	241	2.40638	219	0.90957	17.3	1.0994	2.1
.526	.19117	241	.40857	219	.90974	17.2	.0992	2.1
.527	.19358	241	.41076	219	.90991	17.2	.0990	2.1
.528	.19599	241	.41295	220	.91008	17.2	.0988	2.1
.529	.19840	242	.41516	220	.91025	17.1	.0986	2.1
1.530	2.20082	242	2.41736	220	0.91042	17.1	1.0984	2.1
.531	.20324	242	.41956	220	.91060	17.1	.0982	2.1
.532	.20566	242	.42176	221	.91077	17.1	.0980	2.1
.533	.20808	242	.42397	221	.91094	17.0	.0978	2.1
.534	.21051	243	.42618	221	.91111	17.0	.0976	2.0
1.535	2.21293	243	2.42839	221	0.91128	17.0	1.0974	2.0
.536	.21536	243	.43060	222	.91145	16.9	.0972	2.0
.537	.21780	243	.43282	222	.91161	16.9	.0970	2.0
.538	.22023	244	.43504	222	.91178	16.9	.0968	2.0
.539	.22267	244	.43726	222	.91195	16.8	.0965	2.0
1.540	2.22510	244	2.43949	223	0.91212	16.8	1.0963	2.0
.541	.22755	244	.44171	223	.91229	16.8	.0961	2.0
.542	.22999	244	.44394	223	.91246	16.7	.0959	2.0
.543	.23243	245	.44617	223	.91262	16.7	.0957	2.0
.544	.23488	245	.44841	223	.91279	16.7	.0955	2.0
1.545	2.23733	245	2.45064	224	0.91296	16.7	1.0953	2.0
.546	.23978	245	.45288	224	.91312	16.6	.0951	2.0
.547	.24224	246	.45512	224	.91329	16.6	.0949	2.0
.548	.24469	246	.45736	224	.91345	16.6	.0947	2.0
.549	.24715	246	.45961	225	.91362	16.5	.0945	2.0
1.550	2.24961	246	2.46186	225	0.91379	16.5	1.0943	2.0
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	cos gd u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.550	2.24601	2.16	2.46186	225	0.91379	16.5	1.0943	2.0
.551	2.25307	2.16	2.46111	225	.91395	16.5	.0942	2.0
.552	2.25454	2.17	2.46036	225	.91411	16.4	.0940	2.0
.553	2.25701	2.17	2.45962	226	.91428	16.4	.0938	2.0
.554	2.25948	2.17	2.45888	226	.91444	16.4	.0936	2.0
1.555	2.26195	2.17	2.45734	226	0.91461	16.3	1.0934	2.0
.556	2.26443	2.18	2.45640	226	.91477	16.3	.0932	2.0
.557	2.26690	2.18	2.45567	227	.91493	16.3	.0930	1.9
.558	2.26938	2.18	2.45493	227	.91510	16.3	.0928	1.9
.559	2.27185	2.18	2.45421	227	.91526	16.2	.0926	1.9
1.560	2.27434	2.18	2.45348	227	0.91542	16.2	1.0924	1.9
.561	2.27683	2.19	2.45275	228	.91558	16.2	.0922	1.9
.562	2.27932	2.19	2.45203	228	.91574	16.1	.0920	1.9
.563	2.28181	2.19	2.45131	228	.91591	16.1	.0918	1.9
.564	2.28430	2.19	2.45060	228	.91607	16.1	.0916	1.9
1.565	2.28679	2.50	2.44988	229	0.91623	16.1	1.0914	1.9
.566	2.28929	2.50	2.44917	229	.91639	16.0	.0912	1.9
.567	2.29179	2.50	2.44846	229	.91655	16.0	.0911	1.9
.568	2.29429	2.50	2.44775	229	.91671	16.0	.0909	1.9
.569	2.29680	2.51	2.44705	230	.91687	15.9	.0907	1.9
1.570	2.29930	2.51	2.44635	230	0.91703	15.9	1.0905	1.9
.571	2.30181	2.51	2.44565	230	.91718	15.9	.0903	1.9
.572	2.30432	2.51	2.44495	230	.91734	15.8	.0901	1.9
.573	2.30683	2.51	2.44426	231	.91750	15.8	.0899	1.9
.574	2.30935	2.52	2.44356	231	.91766	15.8	.0897	1.9
1.575	2.31187	2.52	2.44287	231	0.91782	15.8	1.0895	1.9
.576	2.31439	2.52	2.44219	231	.91797	15.7	.0894	1.9
.577	2.31691	2.52	2.44150	232	.91813	15.7	.0892	1.9
.578	2.31943	2.53	2.44082	232	.91829	15.7	.0890	1.9
.579	2.32196	2.53	2.44014	232	.91845	15.6	.0888	1.9
1.580	2.32449	2.53	2.43947	232	0.91860	15.6	1.0886	1.9
.581	2.32702	2.53	2.43879	233	.91876	15.6	.0884	1.8
.582	2.32956	2.54	2.43812	233	.91891	15.6	.0882	1.8
.583	2.33209	2.54	2.43745	233	.91907	15.5	.0881	1.8
.584	2.33463	2.54	2.43678	233	.91922	15.5	.0879	1.8
1.585	2.33717	2.54	2.43612	234	0.91938	15.5	1.0877	1.8
.586	2.33972	2.54	2.43546	234	.91953	15.4	.0875	1.8
.587	2.34226	2.55	2.43480	234	.91969	15.4	.0873	1.8
.588	2.34481	2.55	2.43414	234	.91984	15.4	.0871	1.8
.589	2.34736	2.55	2.43349	235	.92000	15.4	.0870	1.8
1.590	2.34991	2.55	2.43284	235	0.92015	15.3	1.0868	1.8
.591	2.35247	2.56	2.43219	235	.92030	15.3	.0866	1.8
.592	2.35502	2.56	2.43154	236	.92046	15.3	.0864	1.8
.593	2.35758	2.56	2.43090	236	.92061	15.2	.0862	1.8
.594	2.36015	2.56	2.43026	236	.92076	15.2	.0861	1.8
1.595	2.36271	2.57	2.42962	236	0.92091	15.2	1.0859	1.8
.596	2.36528	2.57	2.42898	237	.92106	15.2	.0857	1.8
.597	2.36785	2.57	2.42835	237	.92122	15.1	.0855	1.8
.598	2.37042	2.57	2.42772	237	.92137	15.1	.0853	1.8
.599	2.37299	2.58	2.42709	237	.92152	15.1	.0852	1.8
1.600	2.37557	2.58	2.42646	238	0.92167	15.1	1.0850	1.8
u	tanh u	$\omega F_0'$	coth u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.600	2.37557	258	2.57716	238	0.92167	15.1	1.0850	1.8
.601	.37815	258	.57984	238	.92182	15.0	.0818	1.8
.602	.38073	258	.58222	238	.92197	15.0	.0816	1.8
.603	.38331	258	.58460	238	.92212	15.0	.0815	1.8
.604	.38590	259	.58699	239	.92227	14.9	.0813	1.8
1.605	2.38849	259	2.58937	239	0.92242	14.9	1.0811	1.8
.606	.39108	259	.59176	239	.92257	14.9	.0810	1.7
.607	.39367	259	.59416	239	.92272	14.9	.0838	1.7
.608	.39626	260	.59655	240	.92286	14.8	.0836	1.7
.609	.39886	260	.59895	240	.92301	14.8	.0834	1.7
1.610	2.40146	260	2.60135	240	0.92316	14.8	1.0832	1.7
.611	.40406	260	.60375	240	.92331	14.8	.0831	1.7
.612	.40667	261	.60616	241	.92346	14.7	.0820	1.7
.613	.40928	261	.60857	241	.92360	14.7	.0827	1.7
.614	.41189	261	.61098	241	.92375	14.7	.0825	1.7
1.615	2.41450	261	2.61339	241	0.92390	14.6	1.0824	1.7
.616	.41711	262	.61581	242	.92404	14.6	.0822	1.7
.617	.41973	262	.61822	242	.92419	14.6	.0820	1.7
.618	.42235	262	.62064	242	.92433	14.6	.0819	1.7
.619	.42497	262	.62307	242	.92448	14.5	.0817	1.7
1.620	2.42760	263	2.62549	243	0.92462	14.5	1.0815	1.7
.621	.43022	263	.62792	243	.92477	14.5	.0814	1.7
.622	.43285	263	.63035	243	.92491	14.5	.0813	1.7
.623	.43548	263	.63279	244	.92506	14.4	.0810	1.7
.624	.43812	264	.63522	244	.92520	14.4	.0808	1.7
1.625	2.44075	264	2.63767	244	0.92535	14.4	1.0807	1.7
.626	.44339	264	.64011	244	.92549	14.3	.0805	1.7
.627	.44603	264	.64255	245	.92563	14.3	.0803	1.7
.628	.44868	264	.64500	245	.92578	14.3	.0802	1.7
.629	.45132	265	.64745	245	.92592	14.3	.0800	1.7
1.630	2.45397	265	2.64990	245	0.92606	14.2	1.0798	1.7
.631	.45662	265	.65236	246	.92620	14.2	.0797	1.7
.632	.45928	265	.65482	246	.92635	14.2	.0795	1.7
.633	.46193	266	.65728	246	.92649	14.2	.0793	1.6
.634	.46459	266	.65974	246	.92663	14.1	.0792	1.6
1.635	2.46725	266	2.66221	247	0.92677	14.1	1.0790	1.6
.636	.46992	266	.66467	247	.92691	14.1	.0789	1.6
.637	.47258	267	.66715	247	.92705	14.1	.0787	1.6
.638	.47525	267	.66962	248	.92719	14.0	.0785	1.6
.639	.47792	267	.67210	248	.92733	14.0	.0784	1.6
1.640	2.48059	267	2.67457	248	0.92747	14.0	1.0782	1.6
.641	.48327	268	.67706	248	.92761	14.0	.0780	1.6
.642	.48595	268	.67954	249	.92775	13.9	.0779	1.6
.643	.48863	268	.68203	249	.92789	13.9	.0777	1.6
.644	.49131	268	.68452	249	.92803	13.9	.0776	1.6
1.645	2.49400	269	2.68701	249	0.92817	13.9	1.0774	1.6
.646	.49669	269	.68951	250	.92831	13.8	.0772	1.6
.647	.49938	269	.69200	250	.92844	13.8	.0771	1.6
.648	.50207	269	.69451	250	.92858	13.8	.0769	1.6
.649	.50477	270	.69701	250	.92872	13.7	.0768	1.6
1.650	2.50746	270	2.69951	251	0.92886	13.7	1.0766	1.6
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.650	2.50746	270	2.69951	251	0.92885	13.7	1.0766	1.6
.651	.51017	270	.70202	251	.92899	13.7	.0764	1.6
.652	.51287	270	.70454	251	.92913	13.7	.0763	1.6
.653	.51557	271	.70705	252	.92927	13.6	.0761	1.6
.654	.51828	271	.70957	252	.92940	13.6	.0760	1.6
1.655	2.52099	271	2.71209	252	0.92954	13.6	1.0758	1.6
.656	.52371	271	.71461	252	.92968	13.6	.0756	1.6
.657	.52642	272	.71713	253	.92981	13.5	.0755	1.6
.658	.52914	272	.71966	253	.92995	13.5	.0753	1.6
.659	.53186	272	.72219	253	.93008	13.5	.0752	1.6
1.660	2.53459	272	2.72472	253	0.93022	13.5	1.0750	1.6
.661	.53731	273	.72726	254	.93035	13.4	.0749	1.6
.662	.54004	273	.72980	254	.93049	13.4	.0747	1.5
.663	.54277	273	.73234	254	.93062	13.4	.0746	1.5
.664	.54551	273	.73489	255	.93075	13.4	.0744	1.5
1.665	2.54824	274	2.73743	255	0.93089	13.3	1.0742	1.5
.666	.55098	274	.73998	255	.93102	13.3	.0741	1.5
.667	.55372	274	.74253	255	.93115	13.3	.0739	1.5
.668	.55647	275	.74509	256	.93129	13.3	.0738	1.5
.669	.55921	275	.74765	256	.93142	13.2	.0736	1.5
1.670	2.56196	275	2.75021	256	0.93155	13.2	1.0735	1.5
.671	.56471	275	.75277	256	.93168	13.2	.0733	1.5
.672	.56747	276	.75534	257	.93182	13.2	.0732	1.5
.673	.57022	276	.75791	257	.93195	13.1	.0730	1.5
.674	.57298	276	.76048	257	.93208	13.1	.0729	1.5
1.675	2.57574	276	2.76305	258	0.93221	13.1	1.0727	1.5
.676	.57851	277	.76563	258	.93234	13.1	.0726	1.5
.677	.58127	277	.76821	258	.93247	13.0	.0724	1.5
.678	.58404	277	.77079	258	.93260	13.0	.0723	1.5
.679	.58682	277	.77338	259	.93273	13.0	.0721	1.5
1.680	2.58959	278	2.77596	259	0.93286	13.0	1.0720	1.5
.681	.59237	278	.77856	259	.93299	13.0	.0718	1.5
.682	.59515	278	.78115	260	.93312	12.9	.0717	1.5
.683	.59793	278	.78375	260	.93325	12.9	.0715	1.5
.684	.60072	279	.78635	260	.93338	12.9	.0714	1.5
1.685	2.60350	279	2.78895	260	0.93351	12.9	1.0712	1.5
.686	.60629	279	.79155	261	.93364	12.8	.0711	1.5
.687	.60909	279	.79416	261	.93376	12.8	.0709	1.5
.688	.61188	280	.79677	261	.93389	12.8	.0708	1.5
.689	.61468	280	.79938	261	.93402	12.8	.0706	1.5
1.690	2.61748	280	2.80200	262	0.93415	12.7	1.0705	1.5
.691	.62028	280	.80462	262	.93427	12.7	.0703	1.5
.692	.62309	281	.80724	263	.93440	12.7	.0702	1.5
.693	.62590	281	.80987	263	.93453	12.7	.0701	1.5
.694	.62871	281	.81249	263	.93465	12.6	.0699	1.4
1.695	2.63152	282	2.81512	263	0.93478	12.6	1.0698	1.4
.696	.63434	282	.81776	263	.93491	12.6	.0696	1.4
.697	.63716	282	.82039	264	.93503	12.5	.0695	1.4
.698	.63998	282	.82303	264	.93516	12.5	.0693	1.4
.699	.64280	283	.82567	264	.93528	12.5	.0692	1.4
1.700	2.64563	283	2.82832	265	0.93541	12.5	1.0691	1.4
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$
1.700	2.61563	283	2.83832	265	0.93541	1.55	1.06091	1.4
.701	.61840	283	.83000	265	.93553	1.55	.06090	1.4
.702	.65129	283	.83301	265	.93566	1.55	.06089	1.4
.703	.65413	284	.83627	265	.93578	1.54	.06088	1.4
.704	.65697	384	.83952	266	.93591	1.54	.06085	1.4
1.705	2.65681	284	2.84158	266	0.93603	1.54	1.06083	1.4
.706	.66265	284	.84421	266	.93615	1.54	.06082	1.4
.707	.66550	285	.84690	267	.93628	1.53	.06081	1.4
.708	.66834	285	.84957	267	.93640	1.53	.06079	1.4
.709	.67119	285	.85224	267	.93652	1.53	.06078	1.4
1.710	2.67105	285	2.85491	267	0.93665	1.53	1.06076	1.4
.711	.67690	285	.85759	268	.93677	1.52	.06075	1.4
.712	.67976	286	.86027	268	.93689	1.52	.06074	1.4
.713	.68262	286	.86295	268	.93701	1.52	.06072	1.4
.714	.68549	287	.86563	269	.93714	1.52	.06071	1.4
1.715	2.68836	287	2.86832	269	0.93726	1.52	1.06069	1.4
.716	.69123	287	.87101	269	.93738	1.51	.06068	1.4
.717	.69410	287	.87370	269	.93750	1.51	.06067	1.4
.718	.69697	288	.87640	270	.93762	1.51	.06065	1.4
.719	.69985	288	.87910	270	.93774	1.51	.06064	1.4
1.720	2.70273	288	2.88180	270	0.93786	1.50	1.06063	1.4
.721	.70561	288	.88450	271	.93798	1.50	.06061	1.4
.722	.70850	289	.88721	271	.93810	1.50	.06060	1.4
.723	.71139	289	.88992	271	.93822	1.50	.06058	1.4
.724	.71428	289	.89263	271	.93834	1.50	.06057	1.4
1.725	2.71717	290	2.89535	272	0.93846	1.49	1.06056	1.4
.726	.72007	290	.89807	272	.93858	1.49	.06054	1.4
.727	.72297	290	.90079	272	.93870	1.49	.06053	1.3
.728	.72587	290	.90351	273	.93882	1.49	.06052	1.3
.729	.72878	291	.90624	273	.93894	1.48	.06051	1.3
1.730	2.73168	291	2.90897	273	0.93906	1.48	1.06050	1.3
.731	.73460	291	.91170	273	.93917	1.48	.06048	1.3
.732	.73751	291	.91444	274	.93929	1.48	.06046	1.3
.733	.74042	292	.91718	274	.93941	1.48	.06045	1.3
.734	.74334	292	.91992	274	.93953	1.47	.06044	1.3
1.735	2.74626	292	2.92266	275	0.93964	1.47	1.06043	1.3
.736	.74919	293	.92541	275	.93976	1.47	.06041	1.3
.737	.75211	293	.92816	275	.93988	1.47	.06040	1.3
.738	.75504	293	.93092	275	.93999	1.46	.06038	1.3
.739	.75798	293	.93367	276	.94011	1.46	.06037	1.3
1.740	2.76091	294	2.93643	276	0.94023	1.46	1.06036	1.3
.741	.76385	294	.93919	276	.94034	1.46	.06034	1.3
.742	.76679	294	.94196	277	.94046	1.46	.06033	1.3
.743	.76973	294	.94473	277	.94057	1.45	.06032	1.3
.744	.77268	295	.94750	277	.94069	1.45	.06031	1.3
1.745	2.77563	295	2.95027	278	0.94080	1.45	1.06030	1.3
.746	.77858	295	.95305	278	.94092	1.45	.06028	1.3
.747	.78153	296	.95583	278	.94103	1.44	.06027	1.3
.748	.78449	296	.95861	278	.94115	1.44	.06025	1.3
.749	.78745	296	.96140	279	.94126	1.44	.06024	1.3
1.750	2.79041	296	2.96419	279	0.94138	1.44	1.06023	1.3
u	tan gd u	$\omega F_u'$	sec gd u	$\omega F_u'$	sin gd u	$\omega F_u'$	cos gd u	$\omega F_u'$

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# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\cosh u$	$\tanh u$	$\operatorname{sech} u$	$\coth u$	$\operatorname{csch} u$	$\operatorname{csch}^2 u$
1.750	2.70041	2.97	0.91138	11.4	1.0643	1.3	
1.751	2.70338	2.97	0.91149	11.4	1.0621	1.3	
1.752	2.70635	2.97	0.91160	11.3	1.0600	1.3	
1.753	2.70932	2.97	0.91172	11.3	1.0579	1.3	
1.754	2.71229	2.98	0.91183	11.3	1.0558	1.3	
1.755	2.71527	2.98	0.91194	11.3	1.0536	1.3	
1.756	2.71825	2.98	0.91205	11.3	1.0515	1.3	
1.757	2.72123	2.98	0.91217	11.2	1.0494	1.3	
1.758	2.72421	2.99	0.91228	11.2	1.0473	1.3	
1.759	2.72719	2.99	0.91239	11.2	1.0451	1.3	
1.760	2.73016	3.00	0.91250	11.2	1.0430	1.3	
1.761	2.73314	3.00	0.91261	11.1	1.0409	1.3	
1.762	2.73611	3.00	0.91273	11.1	1.0388	1.3	
1.763	2.73909	3.00	0.91284	11.1	1.0367	1.2	
1.764	2.74206	3.00	0.91295	11.1	1.0346	1.2	
1.765	2.74504	3.01	0.91306	11.1	1.0325	1.2	
1.766	2.74802	3.01	0.91317	11.0	1.0304	1.2	
1.767	2.75100	3.01	0.91328	11.0	1.0283	1.2	
1.768	2.75398	3.01	0.91339	11.0	1.0262	1.2	
1.769	2.75696	3.02	0.91350	11.0	1.0241	1.2	
1.770	2.75994	3.02	0.91361	10.9	1.0220	1.2	
1.771	2.76292	3.02	0.91372	10.9	1.0199	1.2	
1.772	2.76590	3.03	0.91383	10.9	1.0178	1.2	
1.773	2.76888	3.03	0.91394	10.9	1.0157	1.2	
1.774	2.77186	3.03	0.91405	10.9	1.0136	1.2	
1.775	2.77484	3.03	0.91416	10.9	1.0115	1.2	
1.776	2.77782	3.04	0.91426	10.8	1.0094	1.2	
1.777	2.78080	3.04	0.91437	10.8	1.0073	1.2	
1.778	2.78378	3.04	0.91448	10.8	1.0052	1.2	
1.779	2.78676	3.05	0.91459	10.8	1.0031	1.2	
1.780	2.78974	3.05	0.91470	10.8	1.0010	1.2	
1.781	2.79272	3.05	0.91480	10.7	0.9989	1.2	
1.782	2.79570	3.06	0.91491	10.7	0.9968	1.2	
1.783	2.79868	3.06	0.91502	10.7	0.9947	1.2	
1.784	2.80166	3.06	0.91513	10.7	0.9926	1.2	
1.785	2.80464	3.06	0.91523	10.7	0.9905	1.2	
1.786	2.80762	3.07	0.91534	10.6	0.9884	1.2	
1.787	2.81060	3.07	0.91544	10.6	0.9863	1.2	
1.788	2.81358	3.07	0.91555	10.6	0.9842	1.2	
1.789	2.81656	3.08	0.91565	10.6	0.9821	1.2	
1.790	2.81954	3.08	0.91576	10.6	0.9800	1.2	
1.791	2.82252	3.08	0.91587	10.5	0.9779	1.2	
1.792	2.82550	3.08	0.91597	10.5	0.9758	1.2	
1.793	2.82848	3.09	0.91608	10.5	0.9737	1.2	
1.794	2.83146	3.09	0.91618	10.5	0.9716	1.2	
1.795	2.83444	3.09	0.91629	10.5	0.9695	1.2	
1.796	2.83742	3.10	0.91639	10.4	0.9674	1.2	
1.797	2.84040	3.10	0.91649	10.4	0.9653	1.2	
1.798	2.84338	3.10	0.91660	10.4	0.9632	1.2	
1.799	2.84636	3.10	0.91670	10.4	0.9611	1.2	
1.800	2.84934	3.11	0.91681	10.4	0.9590	1.2	
$u$	$\tanh u$	$\operatorname{sech} u$	$\coth u$	$\operatorname{csch} u$	$\operatorname{csch}^2 u$	$\operatorname{csch}^3 u$	$\operatorname{csch}^4 u$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
1.800	2.94217	311	3.10747	294	0.94681	10.4	1.0561	1.2
.801	.94528	311	.11042	295	.94691	10.3	.0501	1.2
.802	.94840	311	.11330	295	.94701	10.3	.0500	1.2
.803	.95151	312	.11631	295	.94711	10.3	.0558	1.1
.804	.95463	312	.11927	295	.94722	10.3	.0557	1.1
1.805	2.95775	312	3.12222	296	0.94732	10.3	1.0556	1.1
.806	.95087	313	.12518	296	.94742	10.2	.0555	1.1
.807	.95400	313	.12814	296	.94753	10.2	.0554	1.1
.808	.95713	313	.13111	297	.94763	10.2	.0553	1.1
.809	.96026	313	.13408	297	.94773	10.2	.0552	1.1
1.810	2.97340	314	3.13705	297	0.94783	10.2	1.0550	1.1
.811	.97654	314	.14003	298	.94793	10.1	.0549	1.1
.812	.97968	314	.14300	298	.94803	10.1	.0548	1.1
.813	.98282	315	.14599	298	.94814	10.1	.0547	1.1
.814	.98597	315	.14897	299	.94824	10.1	.0546	1.1
1.815	2.98912	315	3.15196	299	0.94834	10.1	1.0545	1.1
.816	.99227	315	.15495	299	.94844	10.0	.0544	1.1
.817	.99543	316	.15794	300	.94854	10.0	.0543	1.1
.818	.99859	316	.16094	300	.94864	10.0	.0542	1.1
.819	3.00175	316	.16394	300	.94874	10.0	.0540	1.1
1.820	3.00492	317	3.16694	300	0.94884	10.0	1.0539	1.1
.821	.00808	317	.16995	301	.94894	10.0	.0538	1.1
.822	.01125	317	.17296	301	.94904	9.9	.0537	1.1
.823	.01443	318	.17597	301	.94914	9.9	.0536	1.1
.824	.01761	318	.17899	302	.94924	9.9	.0535	1.1
1.825	3.02079	318	3.18201	302	0.94933	9.9	1.0534	1.1
.826	.02397	319	.18503	302	.94943	9.9	.0533	1.1
.827	.02716	319	.18805	303	.94953	9.8	.0532	1.1
.828	.03035	319	.19108	303	.94963	9.8	.0530	1.1
.829	.03354	319	.19411	303	.94973	9.8	.0529	1.1
1.830	3.03674	320	3.19715	304	0.94983	9.8	1.0528	1.1
.831	.03994	320	.20019	304	.94992	9.8	.0527	1.1
.832	.04314	320	.20323	304	.95002	9.7	.0526	1.1
.833	.04634	321	.20627	305	.95012	9.7	.0525	1.1
.834	.04955	321	.20932	305	.95022	9.7	.0524	1.1
1.835	3.05276	321	3.21237	305	0.95031	9.7	1.0523	1.1
.836	.05597	322	.21543	306	.95041	9.7	.0522	1.1
.837	.05919	322	.21849	306	.95051	9.7	.0521	1.1
.838	.06241	322	.22155	306	.95060	9.6	.0520	1.1
.839	.06563	322	.22461	307	.95070	9.6	.0519	1.1
1.840	3.06886	323	3.22768	307	0.95080	9.6	1.0518	1.1
.841	.07209	323	.23075	307	.95089	9.6	.0516	1.1
.842	.07532	323	.23382	308	.95099	9.6	.0515	1.1
.843	.07856	324	.23690	308	.95108	9.5	.0514	1.1
.844	.08180	324	.23998	308	.95118	9.5	.0513	1.1
1.845	3.08504	324	3.24306	309	0.95127	9.5	1.0512	1.1
.846	.08828	325	.24615	309	.95137	9.5	.0511	1.0
.847	.09153	325	.24924	309	.95146	9.5	.0510	1.0
.848	.09478	325	.25233	309	.95156	9.5	.0509	1.0
.849	.09803	326	.25543	310	.95165	9.4	.0508	1.0
1.850	3.10129	326	3.25853	310	0.95175	9.4	1.0507	1.0
$u$	$\tanh u$	$\omega F_0'$	$\sec u$	$\omega F_0'$	$\sin u$	$\omega F_0'$	$\csc u$	$\omega F_0'$

SMITHSONIAN TABLES

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
1.850	3.10120	326	3.25853	310	0.95175	9.1	1.0507	1.0
.851	.10155	326	.26163	310	.95181	9.1	.0506	1.0
.852	.10181	326	.26171	311	.95193	9.1	.0505	1.0
.853	.11108	327	.26285	311	.95203	9.1	.0504	1.0
.854	.11135	327	.27096	311	.95212	9.3	.0503	1.0
1.855	3.11762	327	3.27108	312	0.95221	9.3	1.0502	1.0
.856	.12090	328	.27719	312	.95231	9.3	.0501	1.0
.857	.12118	328	.28032	312	.95240	9.3	.0500	1.0
.858	.12716	328	.28341	313	.95249	9.3	.0499	1.0
.859	.13074	329	.28657	313	.95259	9.3	.0498	1.0
1.860	3.13403	329	3.28970	313	0.95268	9.2	1.0497	1.0
.861	.13732	329	.29281	314	.95277	9.2	.0496	1.0
.862	.14062	330	.29598	314	.95285	9.2	.0495	1.0
.863	.14302	330	.29912	314	.95295	9.2	.0494	1.0
.864	.14722	330	.30227	315	.95305	9.2	.0493	1.0
1.865	3.15052	331	3.30542	315	0.95314	9.2	1.0492	1.0
.866	.15383	331	.30857	315	.95323	9.1	.0491	1.0
.867	.15714	331	.31172	316	.95332	9.1	.0490	1.0
.868	.16045	331	.31488	316	.95341	9.1	.0489	1.0
.869	.16377	332	.31804	316	.95350	9.1	.0488	1.0
1.870	3.16709	332	3.32121	317	0.95359	9.1	1.0487	1.0
.871	.17041	332	.32438	317	.95368	9.0	.0486	1.0
.872	.17372	333	.32755	317	.95378	9.0	.0485	1.0
.873	.17706	333	.33073	318	.95387	9.0	.0484	1.0
.874	.18040	333	.33390	318	.95396	9.0	.0483	1.0
1.875	3.18473	344	3.33709	318	0.95405	9.0	1.0482	1.0
.876	.18707	331	.34027	319	.95414	9.0	.0481	1.0
.877	.19041	331	.34346	319	.95422	8.9	.0480	1.0
.878	.19376	335	.34665	319	.95431	8.9	.0479	1.0
.879	.19711	335	.34985	320	.95440	8.9	.0478	1.0
1.880	3.20046	335	3.35305	320	0.95449	8.9	1.0477	1.0
.881	.20381	336	.35625	320	.95458	8.9	.0476	1.0
.882	.20717	336	.35946	321	.95467	8.9	.0475	1.0
.883	.21053	336	.36266	321	.95475	8.8	.0474	1.0
.884	.21390	337	.36588	321	.95485	8.8	.0473	1.0
1.885	3.21726	337	3.36909	322	0.95493	8.8	1.0472	1.0
.886	.22063	337	.37231	322	.95502	8.8	.0471	1.0
.887	.22401	338	.37553	322	.95511	8.8	.0470	1.0
.888	.22738	338	.37876	323	.95520	8.8	.0469	1.0
.889	.23076	338	.38199	323	.95529	8.7	.0468	1.0
1.890	3.23415	339	3.38522	323	0.95537	8.7	1.0467	1.0
.891	.23753	339	.38846	324	.95546	8.7	.0466	1.0
.892	.24093	339	.39170	324	.95555	8.7	.0465	1.0
.893	.24432	339	.39494	324	.95563	8.7	.0464	1.0
.894	.24772	340	.39818	325	.95572	8.7	.0463	0.9
1.895	3.25112	340	3.40143	325	0.95581	8.6	1.0462	0.9
.896	.25452	340	.40469	325	.95589	8.6	.0461	0.9
.897	.25792	341	.40794	326	.95598	8.6	.0460	0.9
.898	.26133	341	.41120	326	.95607	8.6	.0460	0.9
.899	.26475	341	.41447	326	.95615	8.6	.0459	0.9
1.900	3.26816	342	3.41773	327	0.95624	8.6	1.0458	0.9
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$



# Natural Hyperbolic Functions.

$x$	$\sinh x$	$\omega F_0'$	$\cosh x$	$\omega F_0'$	$\tanh x$	$\omega F_0'$	$\coth x$	$\omega F_0'$
1.900	3.26816	342	3.41773	327	0.95621	8.6	1.0438	0.0
.901	.27158	342	.42100	327	.95633	8.5	.0452	0.0
.902	.27500	342	.42442	328	.95641	8.5	.0450	0.0
.903	.27843	343	.42785	328	.95649	8.5	.0455	0.0
.904	.28186	343	.43083	328	.95658	8.5	.0451	0.0
1.905	3.28529	343	3.43412	329	0.95666	8.5	1.0453	0.0
.906	.28873	344	.43749	329	.95675	8.5	.0452	0.0
.907	.29217	344	.44069	329	.95683	8.4	.0451	0.0
.908	.29561	344	.44399	330	.95692	8.4	.0450	0.0
.909	.29906	345	.44728	330	.95700	8.4	.0449	0.0
1.910	3.30250	345	3.45058	330	0.95709	8.4	1.0448	0.0
.911	.30596	345	.45389	331	.95717	8.4	.0447	0.0
.912	.30941	346	.45720	331	.95725	8.4	.0447	0.0
.913	.31287	346	.46051	331	.95734	8.4	.0446	0.0
.914	.31633	346	.46382	332	.95742	8.3	.0445	0.0
1.915	3.31980	347	3.46714	332	0.95750	8.3	1.0444	0.0
.916	.32327	347	.47046	332	.95759	8.3	.0443	0.0
.917	.32674	347	.47379	333	.95767	8.3	.0442	0.0
.918	.33021	348	.47712	333	.95775	8.3	.0441	0.0
.919	.33369	348	.48045	333	.95783	8.3	.0440	0.0
1.920	3.33718	348	3.48378	334	0.95792	8.2	1.0440	0.0
.921	.33766	349	.48712	334	.95800	8.2	.0438	0.0
.922	.34115	349	.49046	334	.95808	8.2	.0438	0.0
.923	.34464	349	.49381	335	.95816	8.2	.0437	0.0
.924	.34814	350	.49716	335	.95825	8.2	.0436	0.0
1.925	3.35164	350	3.50051	335	0.95833	8.2	1.0435	0.0
.926	.35514	350	.50387	336	.95841	8.1	.0434	0.0
.927	.35864	351	.50723	336	.95850	8.1	.0433	0.0
.928	.36215	351	.51059	337	.95857	8.1	.0432	0.0
.929	.36567	351	.51395	337	.95865	8.1	.0431	0.0
1.930	3.37218	352	3.51733	337	0.95873	8.1	1.0430	0.0
.931	.37570	352	.52070	338	.95881	8.1	.0430	0.0
.932	.37921	352	.52408	338	.95890	8.1	.0429	0.0
.933	.38275	353	.52746	338	.95898	8.0	.0428	0.0
.934	.38628	353	.53085	339	.95906	8.0	.0427	0.0
1.935	3.38981	353	3.53423	339	0.95914	8.0	1.0426	0.0
.936	.39335	354	.53763	339	.95922	8.0	.0425	0.0
.937	.39689	354	.54103	340	.95930	8.0	.0424	0.0
.938	.40043	354	.54443	340	.95938	8.0	.0423	0.0
.939	.40397	355	.54782	340	.95945	7.9	.0423	0.0
1.940	3.40752	355	3.55123	341	0.95953	7.9	1.0422	0.0
.941	.41108	355	.55461	341	.95961	7.9	.0421	0.0
.942	.41463	356	.55805	341	.95969	7.9	.0420	0.0
.943	.41819	356	.56147	342	.95977	7.9	.0419	0.0
.944	.42176	356	.56489	342	.95985	7.9	.0418	0.0
1.945	3.42532	357	3.56831	343	0.95993	7.9	1.0417	0.0
.946	.42889	357	.57171	343	.96001	7.8	.0417	0.0
.947	.43247	358	.57517	343	.96009	7.8	.0416	0.0
.948	.43604	358	.57860	344	.96016	7.8	.0415	0.0
.949	.43962	358	.58201	344	.96024	7.8	.0414	0.0
1.950	3.44321	359	3.58548	344	0.96032	7.8	1.0413	0.8
$u$	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

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# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
1.950	3.44321	359	3.58548	344	0.96032	7.8	1.0413	0.8
.951	.44070	359	.58893	345	.96040	7.8	.0412	
.952	.45048	359	.59437	345	.96047	7.7	.0412	
.953	.45308	360	.59583	345	.96055	7.7	.0411	
.954	.45758	360	.59928	346	.96063	7.7	.0410	
1.955	3.46118	360	3.60274	346	0.96071	7.7	1.0409	0.8
.956	.46478	361	.60520	346	.96078	7.7	.0408	
.957	.46830	361	.60957	347	.96086	7.7	.0407	
.958	.47200	361	.61314	347	.96094	7.7	.0407	
.959	.47564	362	.61662	348	.96101	7.6	.0406	
1.960	3.47923	362	3.62009	348	0.96109	7.6	1.0405	0.8
.961	.48386	362	.62357	348	.96117	7.6	.0404	
.962	.48648	363	.62706	349	.96124	7.6	.0403	
.963	.49011	363	.63055	349	.96132	7.6	.0402	
.964	.49374	363	.63404	349	.96139	7.6	.0402	
1.965	3.49738	364	3.63753	350	0.96147	7.6	1.0401	0.8
.966	.50102	364	.64103	350	.96155	7.5	.0400	
.967	.50466	364	.64454	350	.96162	7.5	.0399	
.968	.50831	365	.64804	351	.96170	7.5	.0398	
.969	.51196	365	.65155	351	.96177	7.5	.0397	
1.970	3.51561	366	3.65507	352	0.96185	7.5	1.0397	0.8
.971	.51927	366	.65858	352	.96192	7.5	.0396	
.972	.52293	366	.66211	352	.96199	7.5	.0395	
.973	.52659	367	.66563	353	.96207	7.4	.0394	
.974	.53026	367	.66916	353	.96214	7.4	.0393	
1.975	3.53393	367	3.67269	353	0.96222	7.4	1.0393	0.8
.976	.53760	368	.67623	354	.96229	7.4	.0392	
.977	.54128	368	.67977	354	.96237	7.4	.0391	
.978	.54495	368	.68331	354	.96244	7.4	.0390	
.979	.54865	369	.68686	355	.96251	7.4	.0389	
1.980	3.55234	369	3.69041	355	0.96259	7.3	1.0389	0.8
.981	.55603	369	.69395	356	.96266	7.3	.0388	
.982	.55972	370	.69752	356	.96273	7.3	.0387	
.983	.56342	370	.70108	356	.96281	7.3	.0386	
.984	.56713	370	.70465	357	.96288	7.3	.0386	
1.985	3.57083	371	3.70821	357	0.96295	7.3	1.0385	0.8
.986	.57454	371	.71179	357	.96302	7.3	.0384	
.987	.57826	372	.71536	358	.96310	7.2	.0383	
.988	.58197	372	.71894	358	.96317	7.2	.0382	
.989	.58569	372	.72253	359	.96324	7.2	.0382	
1.990	3.58942	373	3.72611	359	0.96331	7.2	1.0381	0.8
.991	.59315	373	.72971	359	.96339	7.2	.0380	
.992	.59688	373	.73330	360	.96346	7.2	.0379	
.993	.60061	374	.73690	360	.96353	7.2	.0379	
.994	.60435	374	.74050	360	.96360	7.1	.0378	
1.995	3.60809	374	3.74411	361	0.96367	7.1	1.0377	0.8
.996	.61184	375	.74772	361	.96374	7.1	.0376	
.997	.61559	375	.75133	362	.96382	7.1	.0375	
.998	.61934	375	.75495	362	.96389	7.1	.0375	
.999	.62310	376	.75857	362	.96396	7.1	.0374	
2.000	3.62686	376	3.76220	363	0.96403	7.1	1.0373	0.8
$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.000	3.62686	376	3.76220	363	0.96103	7.1	1.0373	0.8
.001	.63052	377	.76582	363	.96110	7.1	.0373	
.002	.63139	377	.76646	363	.96117	7.0	.0373	
.003	.63816	377	.77309	364	.96124	7.0	.0371	
.004	.64194	378	.77073	364	.96131	7.0	.0370	
2.005	3.64572	378	3.78038	365	0.96138	7.0	1.0369	0.8
.006	.64950	378	.78402	365	.96145	7.0	.0369	0.8
.007	.65338	379	.78768	365	.96152	7.0	.0368	0.7
.008	.65707	379	.79133	366	.96159	7.0	.0367	
.009	.66087	379	.79499	366	.96166	6.9	.0366	
2.010	3.66466	380	3.79895	366	0.96173	6.9	1.0366	0.7
.011	.66846	380	.80232	367	.96180	6.9	.0365	
.012	.67227	381	.80599	367	.96187	6.9	.0364	
.013	.67608	381	.80966	368	.96193	6.9	.0363	
.014	.67989	381	.81334	368	.96200	6.9	.0363	
2.015	3.68370	382	3.81702	368	0.96207	6.9	1.0362	0.7
.016	.68752	382	.82071	369	.96214	6.9	.0361	
.017	.69134	382	.82440	369	.96221	6.8	.0360	
.018	.69517	383	.82809	370	.96228	6.8	.0360	
.019	.69900	383	.83179	370	.96235	6.8	.0359	
2.020	3.70283	384	3.83549	370	0.96241	6.8	1.0358	0.7
.021	.70667	384	.83919	371	.96248	6.8	.0358	
.022	.71051	384	.84290	371	.96255	6.8	.0357	
.023	.71436	385	.84662	371	.96262	6.8	.0356	
.024	.71821	385	.85033	372	.96268	6.7	.0355	
2.025	3.72205	385	3.85405	372	0.96275	6.7	1.0355	0.7
.026	.72591	385	.85778	373	.96282	6.7	.0354	
.027	.72977	386	.86150	373	.96289	6.7	.0353	
.028	.73364	387	.86524	373	.96295	6.7	.0352	
.029	.73750	387	.86897	374	.96302	6.7	.0352	
2.030	3.74138	387	3.87271	374	0.96309	6.7	1.0351	0.7
.031	.74525	388	.87645	375	.96315	6.7	.0350	
.032	.74913	388	.88020	375	.96322	6.6	.0350	
.033	.75301	388	.88395	375	.96329	6.6	.0349	
.034	.75690	389	.88771	376	.96335	6.6	.0348	
2.035	3.76079	389	3.89147	376	0.96342	6.6	1.0347	0.7
.036	.76468	390	.89523	376	.96348	6.6	.0347	
.037	.76858	390	.89900	377	.96355	6.6	.0346	
.038	.77248	390	.90277	377	.96362	6.6	.0345	
.039	.77638	391	.90654	378	.96368	6.6	.0345	
2.040	3.78029	391	3.91032	378	0.96375	6.5	1.0344	0.7
.041	.78420	391	.91410	378	.96381	6.5	.0343	
.042	.78812	392	.91789	379	.96388	6.5	.0343	
.043	.79204	392	.92168	379	.96394	6.5	.0342	
.044	.79596	393	.92547	380	.96401	6.5	.0341	
2.045	3.79989	393	3.92927	380	0.96407	6.5	1.0340	0.7
.046	.80382	393	.93307	380	.96414	6.5	.0340	
.047	.80776	394	.93688	381	.96420	6.5	.0339	
.048	.81169	394	.94069	381	.96427	6.4	.0338	
.049	.81564	394	.94450	382	.96433	6.4	.0338	
2.050	3.81958	395	3.94832	382	0.96440	6.4	1.0337	0.7
$u$	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\operatorname{csch} u$	$\omega F_0'$	$\operatorname{cosech} u$	$\omega F_0'$

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# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.050	3.81958	395	3.94832	382	0.96740	6.4	1.0337	0.7
.051	.82353	395	.95211	382	.96746	6.4	.0330	
.052	.82749	395	.95597	383	.96752	6.4	.0336	
.053	.83145	396	.95979	383	.96759	6.4	.0335	
.054	.83541	396	.96363	384	.96765	6.4	.0334	
2.055	3.83937	397	3.96747	384	0.96771	6.4	1.0334	0.7
.056	.84334	397	.97131	384	.96778	6.3	.0333	
.057	.84732	398	.97515	385	.96784	6.3	.0332	
.058	.85129	398	.97900	385	.96790	6.3	.0332	
.059	.85527	398	.98285	386	.96797	6.3	.0331	
2.060	3.85926	399	3.98671	386	0.96803	6.3	1.0330	0.7
.061	.86325	399	.99057	386	.96809	6.3	.0330	
.062	.86724	399	.99444	387	.96816	6.3	.0329	
.063	.87124	400	.99831	387	.96822	6.3	.0328	
.064	.87524	400	4.00218	388	.96828	6.2	.0328	
2.065	3.87924	401	4.00606	388	0.96834	6.2	1.0327	0.7
.066	.88325	401	.00994	388	.96841	6.2	.0326	
.067	.88726	401	.01382	389	.96847	6.2	.0326	
.068	.89128	402	.01771	389	.96853	6.2	.0325	
.069	.89530	402	.02161	390	.96859	6.2	.0324	
2.070	3.89932	403	4.02550	390	0.96865	6.2	1.0324	0.7
.071	.90335	403	.02941	390	.96872	6.2	.0323	
.072	.90738	403	.03331	391	.96878	6.1	.0322	
.073	.91141	404	.03722	391	.96884	6.1	.0322	
.074	.91545	404	.04113	392	.96890	6.1	.0321	
2.075	3.91950	405	4.04505	392	0.96896	6.1	1.0320	0.7
.076	.92354	405	.04897	392	.96902	6.1	.0320	0.6
.077	.92759	405	.05290	393	.96908	6.1	.0319	
.078	.93165	405	.05683	393	.96914	6.1	.0318	
.079	.93571	406	.06076	394	.96920	6.1	.0318	
2.080	3.93977	406	4.06470	394	0.96926	6.1	1.0317	0.6
.081	.94384	407	.06854	394	.96933	6.0	.0316	
.082	.94791	407	.07250	395	.96939	6.0	.0316	
.083	.95198	408	.07654	395	.96945	6.0	.0315	
.084	.95606	408	.08049	396	.96951	6.0	.0315	
2.085	3.96014	408	4.08445	396	0.96957	6.0	1.0314	0.6
.086	.96423	409	.08841	396	.96963	6.0	.0313	
.087	.96833	409	.09238	397	.96969	6.0	.0313	
.088	.97241	410	.09635	397	.96975	6.0	.0312	
.089	.97651	410	.10032	398	.96980	5.9	.0311	
2.090	3.98061	410	4.10430	398	0.96986	5.9	1.0311	0.6
.091	.98472	411	.10828	398	.96992	5.9	.0310	
.092	.98883	411	.11227	399	.96998	5.9	.0309	
.093	.99294	412	.11626	399	.97004	5.9	.0309	
.094	.99706	412	.12026	400	.97010	5.9	.0308	
2.095	4.00119	412	4.12426	400	0.97016	5.9	1.0308	0.6
.096	.00531	413	.12826	401	.97022	5.9	.0307	
.097	.00944	413	.13227	401	.97028	5.9	.0306	
.098	.01358	414	.13628	401	.97034	5.8	.0306	
.099	.01771	414	.14029	402	.97039	5.8	.0305	
2.100	4.02186	414	4.14431	402	0.97045	5.8	1.0304	0.6
$u$	$\tan gd u$	$\omega F_0'$	$\sec gd u$	$\omega F_0'$	$\sin gd u$	$\omega F_0'$	$\csc gd u$	$\omega F_0'$

Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.100	4.02186	414	4.14431	402	0.07045	5.8	1.0304	0.6
.101	.02600	415	4.14834	403	.07051	5.8	.0304	
.102	.03015	415	.15237	403	.07057	5.8	.0303	
.103	.03431	416	.15640	403	.07063	5.8	.0303	
.104	.03847	416	.16043	404	.07068	5.8	.0302	
2.105	4.04263	416	4.16447	404	0.07074	5.8	1.0301	0.6
.105	.04680	417	.16852	405	.07080	5.8	.0301	
.107	.05097	417	.17257	405	.07086	5.7	.0300	
.108	.05514	418	.17662	405	.07091	5.7	.0300	
.109	.05932	418	.18068	406	.07097	5.7	.0299	
2.110	4.06350	418	4.18474	406	0.07103	5.7	1.0298	0.6
.111	.06769	419	.18881	407	.07109	5.7	.0298	
.112	.07188	419	.19288	407	.07114	5.7	.0297	
.113	.07607	420	.19695	408	.07120	5.7	.0297	
.114	.08027	420	.20103	408	.07126	5.7	.0296	
2.115	4.08448	421	4.20511	408	0.07131	5.7	1.0295	0.6
.116	.08868	421	.20920	409	.07137	5.6	.0295	
.117	.09289	421	.21329	409	.07143	5.6	.0294	
.118	.09711	422	.21738	410	.07148	5.6	.0294	
.119	.10133	422	.22148	410	.07154	5.6	.0293	
2.120	4.10555	423	4.22558	411	0.07159	5.6	1.0293	0.6
.121	.10978	423	.22969	411	.07165	5.6	.0292	
.122	.11401	423	.23380	411	.07171	5.6	.0291	
.123	.11825	424	.23792	412	.07176	5.6	.0291	
.124	.12249	424	.24204	412	.07182	5.6	.0290	
2.125	4.12673	425	4.24617	413	0.07187	5.5	1.0289	0.6
.126	.13098	425	.25029	413	.07193	5.5	.0289	
.127	.13523	425	.25443	414	.07198	5.5	.0288	
.128	.13949	426	.25856	414	.07204	5.5	.0288	
.129	.14375	426	.26271	414	.07209	5.5	.0287	
2.130	4.14801	427	4.26685	415	0.07215	5.5	1.0286	0.6
.131	.15228	427	.27100	415	.07220	5.5	.0286	
.132	.15656	428	.27516	416	.07226	5.5	.0285	
.133	.16083	428	.27932	416	.07231	5.5	.0285	
.134	.16512	428	.28348	417	.07237	5.4	.0284	
2.135	4.16940	429	4.28765	417	0.07242	5.4	1.0284	0.6
.136	.17369	429	.29182	417	.07248	5.4	.0284	
.137	.17798	430	.29599	418	.07253	5.4	.0283	
.138	.18228	430	.30017	418	.07258	5.4	.0283	
.139	.18658	430	.30436	419	.07264	5.4	.0281	
2.140	4.19089	431	4.30855	419	0.07269	5.4	1.0281	0.6
.141	.19520	431	.31274	420	.07275	5.4	.0280	
.142	.19952	432	.31694	420	.07280	5.4	.0280	
.143	.20384	432	.32114	420	.07285	5.4	.0279	
.144	.20816	433	.32534	421	.07291	5.3	.0278	
2.145	4.21249	433	4.32955	421	0.07296	5.3	1.0278	0.6
.146	.21682	433	.33377	422	.07301	5.3	.0277	
.147	.22115	434	.33799	422	.07307	5.3	.0277	
.148	.22549	434	.34221	423	.07312	5.3	.0276	
.149	.22981	435	.34644	423	.07317	5.3	.0276	
2.150	4.23419	435	4.35067	423	0.07323	5.3	1.0275	0.6
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.150	4.23419	435	4.35067	423	0.97323	5.3	1.0275	0.6
.151	.238851	435	.35191	424	.97328	5.3	.0275	
.152	.24300	436	.35915	424	.97333	5.3	.0274	
.153	.24726	436	.36339	425	.97338	5.3	.0273	
.154	.25162	437	.36764	425	.97344	5.2	.0273	
2.155	4.25509	437	4.37190	426	0.97349	5.2	1.0272	0.6
.156	.26037	438	.37615	426	.97354	5.2	.0272	0.6
.157	.26475	438	.38042	426	.97359	5.2	.0271	0.5
.158	.26913	438	.38468	427	.97365	5.2	.0271	0.5
.159	.27352	439	.38896	427	.97370	5.2	.0270	0.5
2.160	4.27791	439	4.39323	428	0.97375	5.2	1.0270	0.5
.161	.28230	440	.39751	428	.97380	5.2	.0269	
.162	.28670	440	.40180	429	.97385	5.2	.0268	
.163	.29111	441	.40608	429	.97390	5.2	.0268	
.164	.29551	441	.41038	430	.97396	5.1	.0267	
2.165	4.29993	441	4.41168	430	0.97401	5.1	1.0267	0.5
.166	.30434	442	.41598	430	.97406	5.1	.0266	
.167	.30876	442	.42028	431	.97411	5.1	.0266	
.168	.31319	443	.42460	431	.97416	5.1	.0265	
.169	.31762	443	.42891	432	.97421	5.1	.0265	
2.170	4.32205	444	4.43623	432	0.97426	5.1	1.0264	0.5
.171	.32649	444	.44056	433	.97431	5.1	.0264	
.172	.33093	444	.44488	433	.97436	5.1	.0263	
.173	.33538	445	.44922	434	.97441	5.1	.0263	
.174	.33983	445	.45355	434	.97446	5.0	.0262	
2.175	4.34429	446	4.45790	434	0.97452	5.0	1.0262	0.5
.176	.34875	446	.46224	435	.97457	5.0	.0261	
.177	.35321	447	.46659	435	.97462	5.0	.0260	
.178	.35768	447	.47095	436	.97467	5.0	.0260	
.179	.36215	448	.47531	436	.97472	5.0	.0259	
2.180	4.36663	448	4.47967	437	0.97477	5.0	1.0259	0.5
.181	.37111	448	.48404	437	.97482	5.0	.0258	
.182	.37560	449	.48842	438	.97487	5.0	.0258	
.183	.38009	449	.49279	438	.97491	5.0	.0257	
.184	.38459	450	.49718	438	.97496	4.9	.0257	
2.185	4.38909	450	4.50156	439	0.97501	4.9	1.0256	0.5
.186	.39359	451	.50595	439	.97506	4.9	.0256	
.187	.39810	451	.51035	440	.97511	4.9	.0255	
.188	.40261	451	.51475	440	.97516	4.9	.0255	
.189	.40713	452	.51916	441	.97521	4.9	.0254	
2.190	4.41165	452	4.52356	441	0.97526	4.9	1.0254	0.5
.191	.41617	453	.52798	442	.97531	4.9	.0253	
.192	.42070	453	.53240	442	.97536	4.9	.0253	
.193	.42524	454	.53682	443	.97541	4.9	.0252	
.194	.42978	454	.54125	443	.97545	4.8	.0252	
2.195	4.43432	455	4.54568	443	0.97550	4.8	1.0251	0.5
.196	.43887	455	.55012	444	.97555	4.8	.0251	
.197	.44342	455	.55456	444	.97560	4.8	.0250	
.198	.44798	456	.55900	445	.97565	4.8	.0250	
.199	.45254	456	.56345	445	.97570	4.8	.0249	
2.200	4.45711	457	4.56791	446	0.97574	4.8	1.0249	0.5
u	tan pd u	$\omega F_0'$	sec pd u	$\omega F_0'$	sin pd u	$\omega F_0'$	csc pd u	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$
2.200	4.45711	457	4.56791	446	0.97571	448	1.0219	0.5
.201	.46168	457	.57237	446	.97570	448	.0218	
.202	.46625	458	.57683	447	.97564	448	.0218	
.203	.47083	458	.58130	447	.97559	448	.0217	
.204	.47541	459	.58577	448	.97553	448	.0217	
2.205	4.48000	459	4.59025	448	0.97508	447	1.0216	0.5
.206	.48459	459	.59473	448	.97503	447	.0216	
.207	.48919	460	.59922	449	.97508	447	.0215	
.208	.49379	460	.60371	449	.97512	447	.0215	
.209	.49840	461	.60821	450	.97517	447	.0214	
2.210	4.50301	461	4.61271	450	0.97622	447	1.0214	0.5
.211	.50762	462	.61721	451	.97626	447	.0213	
.212	.51224	462	.62172	451	.97631	447	.0213	
.213	.51687	463	.62624	452	.97636	447	.0213	
.214	.52149	463	.63076	452	.97640	447	.0212	
2.215	4.52613	464	4.63528	453	0.97645	447	1.0211	0.5
.216	.53077	464	.63981	453	.97650	446	.0211	
.217	.53541	464	.64434	454	.97654	446	.0210	
.218	.54005	465	.64888	454	.97659	446	.0210	
.219	.54471	465	.65342	454	.97664	446	.0209	
2.220	4.54936	466	4.65797	455	0.97668	446	1.0209	0.5
.221	.55402	466	.66252	455	.97673	446	.0208	
.222	.55869	467	.66708	456	.97678	446	.0208	
.223	.56336	467	.67164	456	.97682	446	.0207	
.224	.56803	468	.67620	457	.97687	446	.0207	
2.225	4.57271	468	4.68078	457	0.97691	446	1.0206	0.5
.226	.57739	469	.68535	458	.97696	446	.0206	
.227	.58208	469	.68993	458	.97700	445	.0205	
.228	.58677	469	.69451	459	.97705	445	.0205	
.229	.59147	470	.69910	459	.97709	445	.0204	
2.230	4.59617	470	4.70370	460	0.97714	445	1.0204	0.5
.231	.60087	471	.70830	460	.97718	445	.0203	
.232	.60559	471	.71290	461	.97723	445	.0203	
.233	.61030	472	.71751	461	.97727	445	.0203	
.234	.61502	472	.72212	462	.97732	445	.0203	
2.235	4.61974	473	4.72674	462	0.97736	445	1.0202	0.5
.236	.62447	473	.73136	462	.97741	445	.0201	
.237	.62921	474	.73599	463	.97745	445	.0201	
.238	.63395	474	.74062	463	.97750	444	.0200	
.239	.63869	475	.74525	464	.97754	444	.0200	
2.240	4.64344	475	4.74989	464	0.97759	444	1.0200	0.5
.241	.64819	475	.75451	465	.97763	444	.0200	
.242	.65295	476	.75919	465	.97768	444	.0200	
.243	.65771	476	.76385	466	.97773	444	.0200	
.244	.66247	477	.76851	466	.97776	444	.0200	
2.245	4.66724	477	4.77317	467	0.97781	444	1.0200	0.5
.246	.67202	478	.77784	467	.97785	444	.0200	
.247	.67680	478	.78252	468	.97790	444	.0200	
.248	.68158	479	.78719	468	.97794	444	.0200	
.249	.68637	479	.79188	469	.97798	444	.0200	
2.250	4.69117	480	4.79657	469	0.97803	443	1.0225	0.5
$u$	$\tanh u$	$\omega F_u'$	$\csc u$	$\omega F_u'$	$\sin u$	$\omega F_u'$	$\sec u$	$\omega F_u'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\infty F_0'$	cosh u	$\infty F_0'$	tanh u	$\infty F_0'$	coth u	$\infty F_0'$
2.250	4.60117	480	4.79657	469	0.97803	4.3	1.0225	0.5
.251	.00507	480	.80126	470	.97807	4.3	.0221	
.252	.70077	481	.80596	470	.97811	4.3	.0224	
.253	.70558	481	.81066	471	.97816	4.3	.0223	
.254	.71039	482	.81537	471	.97820	4.3	.0223	0.5
2.255	4.71521	482	4.82008	472	0.97824	4.3	1.0222	0.4
.256	.72003	482	.82480	472	.97829	4.3	.0222	
.257	.72486	483	.82952	472	.97833	4.3	.0222	
.258	.72969	483	.83425	473	.97837	4.3	.0221	
.259	.73453	484	.83898	473	.97841	4.3	.0221	
2.260	4.73937	484	4.84372	474	0.97846	4.3	1.0220	0.4
.261	.74422	485	.84846	474	.97850	4.3	.0220	
.262	.74907	485	.85321	475	.97854	4.2	.0219	
.263	.75392	485	.85796	475	.97858	4.2	.0219	
.264	.75878	486	.86272	476	.97863	4.2	.0218	
2.265	4.76365	487	4.86748	476	0.97867	4.2	1.0218	0.4
.266	.76852	487	.87224	477	.97871	4.2	.0218	
.267	.77339	488	.87701	477	.97875	4.2	.0217	
.268	.77827	488	.88179	478	.97879	4.2	.0217	
.269	.78316	489	.88657	478	.97884	4.2	.0216	
2.270	4.78804	489	4.89136	479	0.97888	4.2	1.0216	0.4
.271	.79291	490	.89615	479	.97892	4.2	.0215	
.272	.79784	490	.90094	480	.97896	4.2	.0215	
.273	.80274	491	.90574	480	.97900	4.2	.0214	
.274	.80765	491	.91055	481	.97905	4.1	.0214	
2.275	4.81256	492	4.91536	481	0.97909	4.1	1.0214	0.4
.276	.81748	492	.92017	482	.97913	4.1	.0213	
.277	.82240	492	.92499	482	.97917	4.1	.0213	
.278	.82733	493	.92982	483	.97921	4.1	.0212	
.279	.83226	493	.93465	483	.97925	4.1	.0212	
2.280	4.83720	494	4.93948	484	0.97929	4.1	1.0211	0.4
.281	.84214	494	.94432	484	.97933	4.1	.0211	
.282	.84709	495	.94917	485	.97937	4.1	.0211	
.283	.85204	495	.95402	485	.97942	4.1	.0210	
.284	.85699	496	.95887	486	.97946	4.1	.0210	
2.285	4.86196	496	4.96373	486	0.97950	4.1	1.0209	0.4
.286	.86692	497	.96859	487	.97954	4.1	.0209	
.287	.87189	497	.97346	487	.97958	4.0	.0208	
.288	.87687	498	.97834	488	.97962	4.0	.0208	
.289	.88185	498	.98322	488	.97966	4.0	.0208	
2.290	4.88684	499	4.98810	489	0.97970	4.0	1.0207	0.4
.291	.89183	499	.99299	489	.97974	4.0	.0207	
.292	.89682	500	.99789	490	.97978	4.0	.0206	
.293	.90184	500	5.00279	490	.97982	4.0	.0206	
.294	.90683	501	.00769	491	.97986	4.0	.0206	
2.295	4.91184	501	5.01260	491	0.97990	4.0	1.0205	0.4
.296	.91685	502	.01751	492	.97994	4.0	.0205	
.297	.92187	502	.02243	492	.97998	4.0	.0205	
.298	.92690	503	.02736	493	.98002	4.0	.0204	
.299	.93193	503	.03229	493	.98006	3.9	.0203	
2.300	4.93696	504	5.03722	494	0.98010	3.9	1.0203	0.4
u	tanh u	$\infty F_0'$	sec gd u	$\infty F_0'$	sin gd u	$\infty F_0'$	csc gd u	$\infty F_0'$



Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	cotg u	$\omega F_u'$
2.300	4.93696	504	5.03722	494	0.98010	3.0	1.0203	0.4
.301	.94300	504	.04216	494	.98014	3.0	.0203	
.302	.94705	505	.04710	495	.98018	3.0	.0203	
.303	.95110	505	.05205	495	.98021	3.0	.0203	
.304	.95515	506	.05701	496	.98025	3.0	.0203	
2.305	4.96221	506	5.06107	496	0.98029	3.0	1.0204	0.4
.306	.96727	507	.06603	497	.98033	3.0	.0204	
.307	.97234	507	.07100	497	.98037	3.0	.0204	
.308	.97742	508	.07688	498	.98041	3.0	.0204	
.309	.98250	508	.08186	498	.98045	3.0	.0204	
2.310	4.98758	509	5.08684	499	0.98049	3.0	1.0205	0.4
.311	.99267	509	.09183	499	.98053	3.0	.0205	
.312	.99777	510	.09683	500	.98057	3.8	.0168	
.313	5.00286	510	.10183	500	.98060	3.8	.0168	
.314	.00797	511	.10683	501	.98064	3.8	.0167	
2.315	5.01308	511	5.11184	501	0.98068	3.8	1.0207	0.4
.316	.01819	512	.11684	502	.98072	3.8	.0167	
.317	.02331	512	.12188	502	.98076	3.8	.0166	
.318	.02844	513	.12691	503	.98079	3.8	.0166	
.319	.03357	513	.13194	503	.98083	3.8	.0165	
2.320	5.03870	514	5.13697	504	0.98087	3.8	1.0208	0.4
.321	.04381	514	.14202	504	.98091	3.8	.0165	
.322	.04893	515	.14706	505	.98095	3.8	.0164	
.323	.05413	515	.15211	505	.98098	3.8	.0164	
.324	.05929	516	.15717	506	.98102	3.8	.0164	
2.325	5.06445	516	5.16223	506	0.98106	3.8	1.0209	0.4
.326	.06961	517	.16730	507	.98110	3.7	.0163	
.327	.07478	517	.17237	507	.98113	3.7	.0163	
.328	.07996	518	.17745	508	.98117	3.7	.0163	
.329	.08514	518	.18253	509	.98121	3.7	.0163	
2.330	5.09032	519	5.18762	509	0.98124	3.7	1.0210	0.4
.331	.09551	519	.19271	510	.98128	3.7	.0161	
.332	.10071	520	.19781	510	.98132	3.7	.0160	
.333	.10591	520	.20291	511	.98136	3.7	.0160	
.334	.11111	521	.20802	511	.98140	3.7	.0160	
2.335	5.11632	521	5.21314	512	0.98143	3.7	1.0211	0.4
.336	.12154	522	.21825	512	.98147	3.7	.0159	
.337	.12676	522	.22338	513	.98150	3.7	.0158	
.338	.13199	523	.22851	513	.98154	3.7	.0158	
.339	.13722	523	.23364	514	.98158	3.7	.0158	
2.340	5.14245	524	5.23878	514	0.98161	3.6	1.0212	0.4
.341	.14770	524	.24393	515	.98165	3.6	.0157	
.342	.15294	525	.24908	515	.98169	3.6	.0157	
.343	.15819	525	.25423	516	.98172	3.6	.0156	
.344	.16345	526	.25939	516	.98176	3.6	.0156	
2.345	5.16871	526	5.26456	517	0.98179	3.6	1.0213	0.4
.346	.17398	527	.26973	517	.98183	3.6	.0155	
.347	.17925	527	.27491	518	.98187	3.6	.0155	
.348	.18453	528	.28009	518	.98190	3.6	.0154	
.349	.18981	529	.28528	519	.98194	3.6	.0154	
2.350	5.19510	529	5.29047	520	0.98197	3.6	1.0214	0.4
u	tanh u	$\omega F_u'$	sec gd u	$\omega F_u'$	sin gd u	$\omega F_u'$	csc gd u	$\omega F_u'$

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Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.350	5.19510	529	5.29047	520	0.98197	3,6	1.0181	0,4
.351	.20039	530	.29567	520	.98201	3,6	.0183	
.352	.20569	530	.30087	521	.98204	3,6	.0183	
.353	.21100	531	.30608	521	.98208	3,6	.0182	
.354	.21630	531	.31129	522	.98212	3,5	.0182	
2.355	5.22162	532	5.31651	522	0.98215	3,5	1.0182	0,4
.356	.22694	532	.32174	523	.98219	3,5	.0181	
.357	.23226	533	.32697	523	.98222	3,5	.0181	
.358	.23759	533	.33220	524	.98226	3,5	.0181	
.359	.24293	534	.33744	524	.98229	3,5	.0180	
2.360	5.24827	534	5.34269	525	0.98233	3,5	1.0180	0,4
.361	.25361	535	.34794	525	.98236	3,5	.0180	
.362	.25896	535	.35319	526	.98240	3,5	.0179	
.363	.26432	536	.35845	526	.98243	3,5	.0179	
.364	.26968	536	.36372	527	.98247	3,5	.0178	
2.365	5.27504	537	5.36899	528	0.98250	3,5	1.0178	0,4
.366	.28042	537	.37427	528	.98254	3,5	.0178	
.367	.28579	538	.37955	529	.98257	3,5	.0177	
.368	.29118	538	.38484	529	.98261	3,4	.0177	
.369	.29656	539	.39014	530	.98264	3,4	.0177	
2.370	5.30196	540	5.39544	530	0.98267	3,4	1.0176	0,4
.371	.30735	540	.40074	531	.98271	3,4	.0176	
.372	.31276	541	.40605	531	.98274	3,4	.0176	
.373	.31817	541	.41137	532	.98278	3,4	.0175	
.374	.32358	542	.41669	532	.98281	3,4	.0175	
2.375	5.32900	542	5.42201	533	0.98285	3,4	1.0175	0,4
.376	.33442	543	.42735	533	.98288	3,4	.0174	0,4
.377	.33985	543	.43268	534	.98291	3,4	.0174	0,4
.378	.34529	544	.43803	535	.98295	3,4	.0173	0,3
.379	.35073	544	.44337	535	.98298	3,4	.0173	0,3
2.380	5.35618	545	5.44873	536	0.98301	3,4	1.0173	0,3
.381	.36163	545	.45409	536	.98305	3,4	.0172	
.382	.36708	546	.45945	537	.98308	3,4	.0172	
.383	.37255	546	.46482	537	.98311	3,3	.0172	
.384	.37801	547	.47020	538	.98315	3,3	.0171	
2.385	5.38349	548	5.47558	538	0.98318	3,3	1.0171	0,3
.386	.38897	548	.48096	539	.98322	3,3	.0171	
.387	.39445	549	.48635	539	.98325	3,3	.0170	
.388	.39994	549	.49175	540	.98328	3,3	.0170	
.389	.40543	550	.49715	541	.98331	3,3	.0170	
2.390	5.41093	550	5.50256	541	0.98335	3,3	1.0169	0,3
.391	.41644	551	.50798	542	.98338	3,3	.0169	
.392	.42195	551	.51339	542	.98341	3,3	.0169	
.393	.42746	552	.51882	543	.98345	3,3	.0168	
.394	.43299	552	.52425	543	.98348	3,3	.0168	
2.395	5.43851	553	5.52969	544	0.98351	3,3	1.0168	0,3
.396	.44405	554	.53513	544	.98354	3,3	.0167	
.397	.44958	554	.54057	545	.98358	3,3	.0167	
.398	.45513	555	.54603	546	.98361	3,3	.0167	
.399	.46068	555	.55148	546	.98364	3,2	.0166	
2.400	5.46623	556	5.55695	547	0.98367	3,2	1.0166	0,3
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.100	5.16623	556	5.55695	547	0.98367	3.2	1.0166	0.3
.101	.17179	556	.56242	547	.98371	3.2	.0166	
.102	.17735	557	.56789	548	.98374	3.2	.0165	
.103	.18292	557	.57337	548	.98377	3.2	.0165	
.104	.18850	558	.57886	549	.98380	3.2	.0165	
2.105	5.19408	558	5.58435	549	0.98384	3.2	1.0164	0.3
.106	.19067	559	.58084	550	.98387	3.2	.0164	
.107	.19626	560	.58635	551	.98390	3.2	.0164	
.108	.19186	560	.60083	551	.98393	3.2	.0163	
.109	.19746	561	.60637	552	.98396	3.2	.0163	
2.110	5.52207	561	5.61189	552	0.98400	3.2	1.0163	0.3
.111	.52709	562	.61741	553	.98404	3.2	.0163	
.112	.53331	562	.62291	553	.98406	3.2	.0162	
.113	.53893	563	.62848	554	.98409	3.2	.0162	
.114	.54456	563	.63402	554	.98412	3.2	.0161	
2.115	5.55020	564	5.63957	555	0.98415	3.1	1.0161	0.3
.116	.55584	565	.64512	556	.98418	3.1	.0161	
.117	.56149	565	.65068	556	.98422	3.1	.0160	
.118	.56715	566	.65624	557	.98425	3.1	.0160	
.119	.57280	566	.66181	557	.98428	3.1	.0160	
2.120	5.57847	567	5.66739	558	0.98431	3.1	1.0159	0.3
.121	.58411	567	.67297	558	.98434	3.1	.0159	
.122	.58981	568	.67856	559	.98437	3.1	.0159	
.123	.59550	568	.68415	560	.98440	3.1	.0158	
.124	.60118	569	.68975	560	.98443	3.1	.0158	
2.125	5.60688	570	5.69535	561	0.98446	3.1	1.0158	0.3
.126	.61257	570	.70096	561	.98450	3.1	.0157	
.127	.61828	571	.70658	562	.98453	3.1	.0157	
.128	.62399	571	.71220	562	.98456	3.1	.0157	
.129	.62970	572	.71783	563	.98459	3.1	.0157	
2.130	5.63542	572	5.72346	564	0.98462	3.1	1.0156	0.3
.131	.64115	573	.72910	564	.98465	3.0	.0156	
.132	.64688	573	.73474	565	.98468	3.0	.0156	
.133	.65262	574	.74039	565	.98471	3.0	.0155	
.134	.65836	575	.74605	566	.98474	3.0	.0155	
2.135	5.66111	575	5.75171	566	0.98477	3.0	1.0155	0.3
.136	.66686	576	.75738	567	.98480	3.0	.0154	
.137	.67263	576	.76305	568	.98483	3.0	.0154	
.138	.67840	577	.76873	568	.98486	3.0	.0154	
.139	.68416	577	.77441	569	.98489	3.0	.0153	
2.140	5.69291	578	5.78010	569	0.98492	3.0	1.0153	0.3
.141	.69872	579	.78580	570	.98495	3.0	.0153	
.142	.70451	579	.79150	570	.98498	3.0	.0153	
.143	.71031	580	.79721	571	.98501	3.0	.0153	
.144	.71611	580	.80292	572	.98504	3.0	.0153	
2.145	5.72191	581	5.80864	572	0.98507	3.0	1.0152	0.3
.146	.72772	581	.81436	573	.98510	3.0	.0151	
.147	.73354	582	.82009	573	.98513	3.0	.0151	
.148	.73936	583	.82583	574	.98516	2.9	.0151	
.149	.74519	583	.83157	575	.98519	2.9	.0150	
2.150	5.75103	584	5.83732	575	0.98522	2.9	1.0150	0.3
$u$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.450	5.75103	584	5.83732	575	0.98522	2.9	1.0150	0.3
.451	.75687	584	.84307	576	.98525	2.9	.0150	
.452	.76271	585	.84883	576	.98528	2.9	.0149	
.453	.76856	585	.85460	577	.98530	2.9	.0149	
.454	.77442	585	.86037	577	.98533	2.9	.0149	
2.455	5.78029	587	5.85615	578	0.98536	2.9	1.0149	0.3
.456	.78615	587	.87193	579	.98539	2.9	.0148	
.457	.79203	588	.87772	579	.98542	2.9	.0148	
.458	.79791	588	.88352	580	.98545	2.9	.0148	
.459	.80380	589	.88932	580	.98548	2.9	.0147	
2.460	5.80969	590	5.89512	581	0.98551	2.9	1.0147	0.3
.461	.81559	590	.90094	582	.98554	2.9	.0147	
.462	.82149	591	.90675	582	.98556	2.9	.0146	
.463	.82740	591	.91258	583	.98559	2.9	.0146	
.464	.83332	592	.91841	583	.98562	2.9	.0146	
2.465	5.83924	592	5.92425	584	0.98565	2.8	1.0146	0.3
.466	.84516	593	.93009	585	.98568	2.8	.0145	
.467	.85110	594	.93594	585	.98571	2.8	.0145	
.468	.85704	594	.94179	586	.98574	2.8	.0145	
.469	.86298	595	.94765	586	.98576	2.8	.0144	
2.470	5.86893	595	5.95352	587	0.98579	2.8	1.0144	0.3
.471	.87489	596	.95939	587	.98582	2.8	.0144	
.472	.88085	597	.96527	588	.98585	2.8	.0144	
.473	.88682	597	.97115	589	.98588	2.8	.0143	
.474	.89279	498	.97704	589	.98590	2.8	.0143	
2.475	5.89877	598	5.98294	590	0.98593	2.8	1.0143	0.3
.476	.90476	599	.98884	591	.98596	2.8	.0142	
.477	.91075	599	.99474	591	.98599	2.8	.0142	
.478	.91675	600	6.00066	592	.98602	2.8	.0142	
.479	.92275	601	.00658	592	.98604	2.8	.0142	
2.480	5.92876	601	6.01250	593	0.98607	2.8	1.0141	0.3
.481	.93478	602	.01844	593	.98610	2.8	.0141	
.482	.94080	602	.02437	594	.98613	2.8	.0141	
.483	.94682	603	.03032	595	.98615	2.7	.0140	
.484	.95286	604	.03627	595	.98618	2.7	.0140	
2.485	5.95890	604	6.04222	596	0.98621	2.7	1.0140	0.3
.486	.96494	605	.04818	596	.98624	2.7	.0140	
.487	.97099	605	.05415	597	.98626	2.7	.0139	
.488	.97705	606	.06013	598	.98629	2.7	.0139	
.489	.98311	607	.06611	598	.98632	2.7	.0139	
2.490	5.98918	607	6.07209	599	0.98635	2.7	1.0138	0.3
.491	.99526	608	.07809	600	.98637	2.7	.0138	
.492	6.00134	608	.08408	600	.98640	2.7	.0138	
.493	.00743	609	.09009	601	.98643	2.7	.0138	
.494	.01352	610	.09610	601	.98645	2.7	.0137	
2.495	6.01962	610	6.10211	602	0.98648	2.7	1.0137	0.3
.496	.02572	611	.10814	603	.98651	2.7	.0137	
.497	.03183	611	.11417	603	.98653	2.7	.0136	
.498	.03795	612	.12020	604	.98656	2.7	.0136	
.499	.04408	613	.12624	604	.98659	2.7	.0136	
2.500	6.05020	613	6.13229	605	0.98661	2.7	1.0136	0.3
u	tanh u	$\omega F_0'$	sech u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\infty F_0'$	$\cosh u$	$\infty F_0'$	$\tanh u$	$\infty F_0'$	$\coth u$	$\infty F_0'$
2.500	6.05020	613	6.13229	605	0.18800	2.7	1.0130	0.3
.501	.05034	614	.13331	606	.08801	2.7	.0135	
.502	.05048	614	.14440	606	.08802	2.0	.0135	
.503	.05063	615	.15017	607	.08803	2.0	.0135	
.504	.05078	616	.15651	607	.08804	2.0	.0135	
2.505	6.08091	616	6.16262	608	0.188075	2.0	1.0131	0.3
.506	.08111	617	.16829	609	.088077	2.0	.0134	
.507	.08128	617	.17479	609	.088080	2.0	.0134	
.508	.08146	618	.18089	610	.088083	2.0	.0134	
.509	.08164	619	.18699	611	.088085	2.0	.0134	
2.510	6.11183	619	6.19310	611	0.188088	2.0	1.0134	0.3
.511	.11180	620	.19921	612	.088090	2.0	.0134	
.512	.11183	621	.20531	612	.088093	2.0	.0134	
.513	.11184	621	.21140	613	.088096	2.0	.0134	
.514	.11185	622	.21760	614	.088098	2.0	.0134	
2.515	6.14287	622	6.22371	614	0.188101	2.0	1.0134	0.3
.516	.14290	623	.22988	615	.088103	2.0	.0134	
.517	.14293	624	.23603	616	.088105	2.0	.0134	
.518	.14295	624	.24219	616	.088108	2.0	.0134	
.519	.14298	625	.24836	617	.088111	2.0	.0134	
2.520	6.17407	625	6.25453	617	0.188114	2.0	1.0130	0.3
.521	.17403	626	.26071	618	.088116	2.0	.0130	
.522	.17405	627	.26689	619	.088119	2.0	.0130	
.523	.17408	627	.27308	619	.088121	2.0	.0130	
.524	.17411	628	.27927	620	.088124	2.0	.0129	
2.525	6.20542	629	6.28548	621	0.188126	2.0	1.0129	0.3
.526	.20544	629	.29169	621	.088129	2.0	.0129	
.527	.20546	630	.29790	622	.088131	2.0	.0128	
.528	.20548	630	.30412	622	.088134	2.0	.0128	
.529	.20551	631	.31035	623	.088136	2.0	.0128	
2.530	6.23692	632	6.31658	624	0.188139	2.0	1.0128	0.3
.531	.23694	632	.32282	624	.088141	2.0	.0127	
.532	.23697	633	.32907	625	.088144	2.0	.0127	
.533	.23699	634	.33532	626	.088146	2.0	.0127	
.534	.23702	634	.34158	626	.088149	2.0	.0127	
2.535	6.26858	635	6.34785	627	0.188151	2.0	1.0126	0.3
.536	.26861	635	.35412	627	.088154	2.0	.0126	
.537	.26863	636	.36040	628	.088156	2.0	.0126	
.538	.26866	637	.36668	629	.088159	2.0	.0126	
.539	.26869	637	.37297	629	.088161	2.0	.0125	
2.540	6.30040	638	6.37927	630	0.188164	2.0	1.0125	0.3
.541	.30043	639	.38557	631	.088166	2.0	.0125	0.3
.542	.30047	639	.39188	631	.088169	2.0	.0125	0.3
.543	.30051	640	.39820	632	.088171	2.0	.0124	0.3
.544	.30055	640	.40452	633	.088173	2.0	.0124	0.2
2.545	6.33238	641	6.41685	633	0.188176	2.0	1.0124	0.2
.546	.33241	642	.41719	634	.088178	2.0	.0124	
.547	.33244	642	.42353	635	.088181	2.0	.0124	
.548	.33247	643	.42988	635	.088183	2.0	.0124	
.549	.33250	644	.43623	636	.088186	2.0	.0124	
2.550	6.36451	644	6.44250	636	0.188188	2.0	1.0123	0.2
$u$	$\tanh u$	$\infty F_0'$	$\coth u$	$\infty F_0'$	$\sinh u$	$\infty F_0'$	$\cosh u$	$\infty F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	cath u	$\omega F_u'$
2.550	0.36151	6.44	0.44259	6.36	0.68788	2.4	1.0123	0.2
.551	.37000	6.45	.44806	6.37	.68790	2.4	.0122	
.552	.37741	6.46	.45333	6.38	.68793	2.4	.0122	
.553	.38387	6.46	.46172	6.38	.68795	2.4	.0122	
.554	.39033	6.47	.46810	6.39	.68798	2.4	.0122	
2.555	0.39680	6.47	0.47450	6.40	0.68800	2.4	1.0121	0.2
.556	.40328	6.48	.48000	6.40	.68802	2.4	.0121	
.557	.40977	6.49	.48730	6.41	.68805	2.4	.0121	
.558	.41626	6.49	.49372	6.42	.68807	2.4	.0121	
.559	.42275	6.50	.50014	6.42	.68810	2.4	.0120	
2.560	0.42926	6.51	0.50656	6.43	0.68812	2.4	1.0120	0.2
.561	.43577	6.51	.51209	6.44	.68814	2.4	.0120	
.562	.44228	6.52	.51913	6.44	.68817	2.4	.0120	
.563	.44880	6.53	.52588	6.45	.68819	2.4	.0120	
.564	.45533	6.53	.53233	6.46	.68821	2.4	.0119	
2.565	0.46187	6.54	0.53879	6.46	0.68824	2.4	1.0119	0.2
.566	.46841	6.55	.54525	6.47	.68826	2.4	.0119	
.567	.47496	6.55	.55173	6.47	.68828	2.4	.0119	
.568	.48152	6.56	.55820	6.48	.68831	2.4	.0118	
.569	.48808	6.56	.56469	6.49	.68833	2.4	.0118	
2.570	0.49464	6.57	0.57118	6.49	0.68835	2.4	1.0118	0.2
.571	.50122	6.58	.57768	6.50	.68838	2.4	.0118	
.572	.50780	6.58	.58418	6.51	.68840	2.4	.0117	
.573	.51430	6.59	.59060	6.51	.68842	2.4	.0117	
.574	.52088	6.60	.59721	6.52	.68845	2.4	.0117	
2.575	0.52758	6.60	0.60374	6.53	0.68847	2.4	1.0117	0.2
.576	.53419	6.61	.61027	6.53	.68849	2.4	.0116	
.577	.54080	6.62	.61680	6.54	.68851	2.4	.0116	
.578	.54742	6.62	.62335	6.55	.68854	2.4	.0116	
.579	.55405	6.63	.62990	6.55	.68856	2.4	.0116	
2.580	0.56068	6.64	0.63646	6.56	0.68858	2.4	1.0115	0.2
.581	.56732	6.64	.64302	6.57	.68860	2.4	.0115	
.582	.57397	6.65	.64959	6.57	.68863	2.4	.0115	
.583	.58061	6.66	.65617	6.58	.68865	2.4	.0115	
.584	.58728	6.66	.66275	6.59	.68867	2.4	.0115	
2.585	0.59395	6.67	0.66934	6.59	0.68870	2.4	1.0114	0.2
.586	.60062	6.68	.67594	6.60	.68872	2.4	.0114	
.587	.60730	6.68	.68254	6.61	.68874	2.4	.0114	
.588	.61398	6.69	.68915	6.61	.68876	2.4	.0114	
.589	.62068	6.70	.69577	6.62	.68878	2.4	.0113	
2.590	0.62738	6.70	0.70240	6.63	0.68881	2.4	1.0113	0.2
.591	.63408	6.71	.70903	6.63	.68883	2.4	.0113	
.592	.64079	6.72	.71566	6.64	.68885	2.4	.0113	
.593	.64751	6.72	.72231	6.65	.68887	2.4	.0113	
.594	.65424	6.73	.72896	6.65	.68890	2.4	.0112	
2.595	0.66097	6.74	0.73562	6.66	0.68892	2.4	1.0112	0.2
.596	.66771	6.74	.74228	6.67	.68894	2.4	.0112	
.597	.67446	6.75	.74895	6.67	.68896	2.4	.0112	
.598	.68121	6.76	.75563	6.68	.68898	2.4	.0111	
.599	.68797	6.76	.76231	6.69	.68901	2.4	.0111	
2.600	0.69473	6.77	0.76901	6.69	0.68903	2.4	1.0111	0.2
u	tan gd u	$\omega F_u'$	sec gd u	$\omega F_u'$	sin gd u	$\omega F_u'$	csc gd u	$\omega F_u'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_o'$	tanh u	$\omega F_o'$	coth u	$\omega F_o'$
2.600	6.69473	677	6.76901	669	0.98903	2,2	1.0111	0,2
.601	.70150	678	.77570	670	.98905	2,2	.0111	
.602	.70828	678	.78241	671	.98907	2,2	.0110	
.603	.71507	679	.78912	672	.98909	2,2	.0110	
.604	.72186	680	.79584	672	.98911	2,2	.0110	
2.605	6.72866	680	6.80256	673	0.98914	2,2	1.0110	0,3
.606	.73547	681	.80930	674	.98916	2,2	.0110	
.607	.74228	682	.81604	674	.98918	2,2	.0109	
.608	.74910	683	.82278	675	.98920	2,1	.0109	
.609	.75593	683	.82953	676	.98922	2,1	.0109	
2.610	6.76276	684	6.83629	676	0.98924	2,1	1.0109	0,3
.611	.76960	684	.84306	677	.98926	2,1	.0109	
.612	.77644	685	.84983	678	.98929	2,1	.0108	
.613	.78330	686	.85661	678	.98931	2,1	.0108	
.614	.79016	686	.86340	679	.98933	2,1	.0108	
2.615	6.79702	687	6.87019	680	0.98935	2,1	1.0108	0,3
.616	.80390	688	.87699	680	.98937	2,1	.0107	
.617	.81078	688	.88380	681	.98939	2,1	.0107	
.618	.81767	689	.89061	682	.98941	2,1	.0107	
.619	.82456	690	.89744	682	.98943	2,1	.0107	
2.620	6.83146	690	6.90426	683	0.98946	2,1	1.0107	0,3
.621	.83837	691	.91110	684	.98948	2,1	.0106	
.622	.84528	692	.91794	685	.98950	2,1	.0106	
.623	.85220	692	.92479	685	.98952	2,1	.0106	
.624	.85913	693	.93164	686	.98954	2,1	.0106	
2.625	6.85607	694	6.93851	687	0.98956	2,1	1.0106	0,3
.626	.87301	695	.94538	687	.98958	2,1	.0105	
.627	.87996	695	.95225	688	.98960	2,1	.0105	
.628	.88691	696	.95914	689	.98962	2,1	.0105	
.629	.89388	697	.96603	689	.98964	2,1	.0105	
2.630	6.90085	697	6.97292	690	0.98966	2,1	1.0104	0,2
.631	.90782	698	.97983	691	.98968	2,1	.0104	
.632	.91481	699	.98674	691	.98970	2,0	.0104	
.633	.92180	699	.99366	692	.98972	2,0	.0104	
.634	.92879	700	7.00058	693	.98974	2,0	.0104	
2.635	6.93580	701	7.00752	694	0.98977	2,0	1.0103	0,2
.636	.94281	701	.01446	694	.98979	2,0	.0103	
.637	.94983	702	.02140	695	.98981	2,0	.0103	
.638	.95685	703	.02835	696	.98983	2,0	.0103	
.639	.96388	704	.03532	696	.98985	2,0	.0103	
2.640	6.97092	704	7.01228	697	0.98987	2,0	1.0102	0,2
.641	.97797	705	.04926	698	.98989	2,0	.0102	
.642	.98502	706	.05624	699	.98991	2,0	.0102	
.643	.99208	706	.06323	699	.98993	2,0	.0102	
.644	.99915	707	.07022	700	.98995	2,0	.0102	
2.645	7.00622	708	7.07723	701	0.98997	2,0	1.0101	0,3
.646	.01330	708	.08423	701	.98999	2,0	.0101	
.647	.02030	709	.09125	702	.99001	2,0	.0101	
.648	.02748	710	.09828	703	.99003	2,0	.0101	
.649	.03458	711	.10531	703	.99005	2,0	.0101	
2.650	7.04169	711	7.11234	704	0.99007	2,0	1.0100	0,2
u	tanh u	$\omega F_u'$	sec gd u	$\omega F_o'$	sin gd u	$\omega F_o'$	csc gd u	$\omega F_o'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.650	7.04169	711	7.11234	704	0.99007	2.0	1.0100	0.2
.651	.04881	712	.11939	705	.99009	2.0	.0100	
.652	.05593	713	.12644	706	.99011	2.0	.0100	
.653	.06306	713	.13350	706	.99013	2.0	.0100	
.654	.07020	714	.14057	707	.99015	2.0	.0100	
2.655	7.07734	715	7.14764	708	0.99016	2.0	1.0099	0.2
.656	.08449	715	.15472	708	.99018	2.0	.0099	
.657	.09165	716	.16181	709	.99020	1.9	.0099	
.658	.09882	717	.16891	710	.99022	1.9	.0099	
.659	.10599	718	.17601	711	.99024	1.9	.0099	
2.660	7.11317	718	7.18312	711	0.99026	1.9	1.0098	0.2
.661	.12036	719	.19024	712	.99028	1.9	.0098	
.662	.12755	720	.19736	713	.99030	1.9	.0098	
.663	.13475	720	.20449	713	.99032	1.9	.0098	
.664	.14196	721	.21163	714	.99034	1.9	.0098	
2.665	7.14918	722	7.21877	715	0.99036	1.9	1.0097	0.2
.666	.15640	723	.22593	716	.99038	1.9	.0097	
.667	.16363	723	.23309	716	.99040	1.9	.0097	
.668	.17086	724	.24025	717	.99042	1.9	.0097	
.669	.17811	725	.24743	718	.99044	1.9	.0097	
2.670	7.18536	725	7.25461	719	0.99045	1.9	1.0095	0.2
.671	.19262	726	.26180	719	.99047	1.9	.0096	
.672	.19988	727	.26900	720	.99049	1.9	.0095	
.673	.20715	728	.27620	721	.99051	1.9	.0095	
.674	.21443	728	.28341	721	.99053	1.9	.0095	
2.675	7.22172	729	7.29063	722	0.99055	1.9	1.0095	0.2
.676	.22902	730	.29785	723	.99057	1.9	.0095	
.677	.23632	731	.30509	724	.99059	1.9	.0095	
.678	.24363	731	.31233	724	.99060	1.9	.0095	
.679	.25094	732	.31957	725	.99062	1.9	.0095	
2.680	7.25827	733	7.32683	726	0.99064	1.9	1.0094	0.2
.681	.26560	733	.33409	727	.99066	1.9	.0094	
.682	.27293	734	.34136	727	.99068	1.9	.0094	
.683	.28028	735	.34864	728	.99070	1.9	.0094	
.684	.28763	736	.35592	729	.99072	1.8	.0094	
2.685	7.29499	736	7.36321	729	0.99073	1.8	1.0094	0.2
.686	.30236	737	.37051	730	.99075	1.8	.0093	
.687	.30973	738	.37782	731	.99077	1.8	.0093	
.688	.31711	739	.38513	732	.99079	1.8	.0093	
.689	.32450	739	.39245	732	.99081	1.8	.0093	
2.690	7.33190	740	7.39978	733	0.99083	1.8	1.0093	0.2
.691	.33930	741	.40711	734	.99084	1.8	.0092	
.692	.34671	741	.41446	735	.99085	1.8	.0092	
.693	.35413	742	.42181	735	.99088	1.8	.0092	
.694	.36156	743	.42917	736	.99090	1.8	.0092	
2.695	7.36899	744	7.43653	737	0.99092	1.8	1.0092	0.2
.696	.37643	744	.44390	738	.99094	1.8	.0091	
.697	.38388	745	.45128	738	.99095	1.8	.0091	
.698	.39133	746	.45867	739	.99097	1.8	.0091	
.699	.39879	747	.46607	740	.99099	1.8	.0091	
2.700	7.40626	747	7.47347	741	0.99101	1.8	1.0091	0.2
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$



# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.700	7.40526	747	7.47347	741	0.99101	1.8	1.0091	0.2
.701	.41374	748	.48088	741	.99103	1.8	.0091	
.702	.42122	749	.48830	742	.99104	1.8	.0090	
.703	.42872	750	.49572	743	.99105	1.8	.0090	
.704	.43622	750	.50315	744	.99108	1.8	.0090	
2.705	7.44372	751	7.51059	744	0.99110	1.8	1.0090	0.2
.706	.45124	752	.51801	745	.99111	1.8	.0090	
.707	.45876	753	.52550	746	.99113	1.8	.0089	
.708	.46629	753	.53296	747	.99115	1.8	.0089	
.709	.47383	754	.54043	747	.99117	1.8	.0089	
2.710	7.48137	755	7.54791	748	0.99118	1.8	1.0089	0.2
.711	.48892	756	.55539	749	.99120	1.8	.0089	
.712	.49648	756	.56288	750	.99122	1.7	.0089	
.713	.50405	757	.57038	750	.99124	1.7	.0088	
.714	.51162	758	.57789	751	.99125	1.7	.0088	
2.715	7.51920	759	7.58541	752	0.99127	1.7	1.0088	0.2
.716	.52679	759	.59293	753	.99129	1.7	.0088	
.717	.53439	760	.60046	753	.99131	1.7	.0088	
.718	.54199	761	.60800	754	.99133	1.7	.0088	
.719	.54960	762	.61555	755	.99134	1.7	.0087	
2.720	7.55722	762	7.62310	756	0.99136	1.7	1.0087	0.2
.721	.56485	763	.63066	756	.99138	1.7	.0087	
.722	.57249	764	.63823	757	.99139	1.7	.0087	
.723	.58013	765	.64580	758	.99141	1.7	.0087	
.724	.58778	765	.65339	759	.99143	1.7	.0086	
2.725	7.59543	766	7.66068	760	0.99144	1.7	1.0086	0.2
.726	.60310	767	.66858	760	.99146	1.7	.0086	
.727	.61077	768	.67619	761	.99148	1.7	.0086	
.728	.61845	768	.68380	762	.99150	1.7	.0086	
.729	.62614	769	.69142	763	.99151	1.7	.0086	
2.730	7.63383	770	7.69905	763	0.99153	1.7	1.0085	0.2
.731	.64154	771	.70669	764	.99155	1.7	.0085	
.732	.64925	771	.71431	765	.99156	1.7	.0085	
.733	.65697	772	.72199	766	.99158	1.7	.0085	
.734	.66469	773	.72965	766	.99160	1.7	.0085	
2.735	7.67242	774	7.73732	767	0.99161	1.7	1.0085	0.2
.736	.68017	774	.74500	768	.99163	1.7	.0085	
.737	.68791	775	.75268	769	.99165	1.7	.0085	
.738	.69567	776	.76037	770	.99166	1.7	.0085	
.739	.70344	777	.76807	770	.99168	1.7	.0085	
2.740	7.71121	778	7.77578	771	0.99170	1.7	1.0085	0.2
.741	.71899	778	.78340	772	.99171	1.7	.0085	
.742	.72677	779	.79122	773	.99173	1.6	.0085	
.743	.73457	780	.79905	773	.99175	1.6	.0085	
.744	.74237	781	.80688	774	.99176	1.6	.0085	
2.745	7.75018	781	7.81443	775	0.99178	1.6	1.0085	0.2
.746	.75800	782	.82219	776	.99179	1.6	.0085	
.747	.76583	783	.82995	777	.99181	1.6	.0085	
.748	.77366	784	.83772	777	.99183	1.6	.0085	
.749	.78150	785	.84549	778	.99184	1.6	.0085	
2.750	7.78935	785	7.85328	779	0.99186	1.6	1.0085	0.2
$u$	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$

Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.750	7.78935	785	7.85328	779	0.99186	1.6	1.0082	0.2
.751	.79721	785	.80107	780	.99188	1.5	.0082	
.752	.80507	787	.80887	781	.99189	1.6	.0082	
.753	.81295	788	.81668	781	.99191	1.6	.0082	
.754	.82083	788	.82450	782	.99192	1.6	.0081	
2.755	7.82872	789	7.89232	783	0.99194	1.6	1.0081	0.2
.756	.83661	790	.90016	784	.99195	1.6	.0081	
.757	.84452	791	.90800	784	.99197	1.6	.0081	
.758	.85243	792	.91585	785	.99199	1.6	.0081	
.759	.86035	792	.92370	786	.99200	1.6	.0081	
2.760	7.85828	793	7.93157	787	0.99202	1.6	1.0080	0.2
.761	.87621	794	.93944	788	.99204	1.6	.0080	
.762	.88415	795	.94732	788	.99205	1.6	.0080	
.763	.89211	796	.95521	789	.99207	1.6	.0080	
.764	.90006	796	.96310	790	.99208	1.6	.0080	
2.765	7.90803	797	7.97101	791	0.99210	1.6	1.0080	0.2
.766	.91601	798	.97892	792	.99212	1.6	.0079	
.767	.92399	799	.98684	792	.99213	1.6	.0079	
.768	.93198	799	.99477	793	.99215	1.6	.0079	
.769	.93998	800	.00270	794	.99216	1.6	.0079	
2.770	7.94799	801	8.01065	795	0.99218	1.6	1.0079	0.2
.771	.95600	802	.01860	796	.99219	1.6	.0079	
.772	.96402	803	.02656	796	.99221	1.6	.0079	
.773	.97205	803	.03453	797	.99222	1.5	.0078	
.774	.98009	804	.04250	798	.99224	1.5	.0078	
2.775	7.98814	805	8.05049	799	0.99226	1.5	1.0078	0.2
.776	.99619	806	.05848	800	.99227	1.5	.0078	
.777	8.00636	807	.06648	800	.99229	1.5	.0078	
.778	.01233	807	.07449	801	.99230	1.5	.0078	
.779	.02040	808	.08251	802	.99232	1.5	.0077	
2.780	8.02849	809	8.09053	803	0.99233	1.5	1.0077	0.2
.781	.03659	810	.09850	804	.99235	1.5	.0077	
.782	.04460	811	.10660	804	.99236	1.5	.0077	
.783	.05280	811	.11465	805	.99238	1.5	.0077	
.784	.06092	812	.12271	806	.99239	1.5	.0077	
2.785	8.06904	813	8.13077	807	0.99241	1.5	1.0077	0.2
.786	.07718	814	.13885	808	.99242	1.5	.0076	
.787	.08532	815	.14693	809	.99244	1.5	.0076	
.788	.09347	816	.15502	809	.99245	1.5	.0076	
.789	.10163	816	.16311	810	.99247	1.5	.0076	
2.790	8.10980	817	8.17123	811	0.99248	1.5	1.0076	0.2
.791	.11797	818	.17933	812	.99250	1.5	.0076	
.792	.12616	819	.18746	813	.99251	1.5	.0075	
.793	.13435	820	.19559	813	.99253	1.5	.0075	
.794	.14255	820	.20373	814	.99254	1.5	.0075	
2.795	8.15076	821	8.21187	815	0.99256	1.5	1.0075	0.2
.796	.15897	822	.22003	816	.99257	1.5	.0075	0.2
.797	.16720	823	.22819	817	.99259	1.5	.0075	0.2
.798	.17543	824	.23636	818	.99260	1.5	.0075	0.2
.799	.18367	824	.24454	818	.99262	1.5	.0074	0.1
2.800	8.19192	825	8.25273	819	0.99263	1.5	1.0074	0.1
$u$	$\tan gd u$	$\omega F_0'$	$\sec gd u$	$\omega F_0'$	$\sin gd u$	$\omega F_0'$	$\csc gd u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.800	8.19192	825	8.25273	819	0.99263	1.5	1.0074	0.1
.801	.20018	826	.26092	820	.99265	1.5	.0074	
.802	.20844	827	.26013	821	.99265	1.5	.0074	
.803	.21671	828	.27734	822	.99268	1.5	.0074	
.804	.22499	829	.28556	822	.99269	1.5	.0074	
2.805	8.23328	829	8.29379	823	0.99270	1.5	1.0073	0.1
.806	.24158	830	.30203	824	.99272	1.5	.0073	
.807	.24989	831	.31027	825	.99273	1.4	.0073	
.808	.25820	832	.31853	826	.99275	1.4	.0073	
.809	.26653	833	.32679	827	.99276	1.4	.0073	
2.810	8.27186	834	8.33506	827	0.99278	1.4	1.0073	0.1
.811	.28320	834	.34334	828	.99279	1.4	.0073	
.812	.29154	835	.35163	829	.99281	1.4	.0072	
.813	.29990	836	.35992	830	.99282	1.4	.0072	
.814	.30826	837	.36823	831	.99283	1.4	.0072	
2.815	8.31664	838	8.37654	832	0.99285	1.4	1.0072	0.1
.816	.32502	838	.38485	833	.99285	1.4	.0072	
.817	.33341	839	.39319	833	.99288	1.4	.0072	
.818	.34180	840	.40153	834	.99289	1.4	.0072	
.819	.35021	841	.40987	835	.99291	1.4	.0071	
2.820	8.35862	842	8.41823	836	0.99292	1.4	1.0071	0.1
.821	.35704	843	.42659	837	.99293	1.4	.0071	
.822	.37548	843	.43496	838	.99295	1.4	.0071	
.823	.38391	844	.44331	838	.99296	1.4	.0071	
.824	.39236	845	.45173	839	.99298	1.4	.0071	
2.825	8.40082	846	8.46013	840	0.99299	1.4	1.0071	0.1
.826	.40928	847	.46853	841	.99300	1.4	.0070	
.827	.41776	848	.47695	842	.99302	1.4	.0070	
.828	.42624	849	.48537	843	.99303	1.4	.0070	
.829	.43473	849	.49380	843	.99305	1.4	.0070	
2.830	8.44322	850	8.50224	844	0.99306	1.4	1.0070	0.1
.831	.45173	851	.51068	845	.99307	1.4	.0070	
.832	.46025	852	.51914	846	.99309	1.4	.0070	
.833	.46877	853	.52760	847	.99310	1.4	.0069	
.834	.47730	854	.53608	848	.99311	1.4	.0069	
2.835	8.48584	854	8.54456	849	0.99313	1.4	1.0069	0.1
.836	.49439	855	.55305	849	.99314	1.4	.0069	
.837	.50295	856	.56155	850	.99316	1.4	.0069	
.838	.51151	857	.57006	851	.99317	1.4	.0069	
.839	.52009	858	.57857	852	.99318	1.4	.0069	
2.840	8.52857	859	8.58710	853	0.99320	1.4	1.0069	0.1
.841	.53726	860	.59563	854	.99321	1.4	.0068	
.842	.54586	860	.60417	855	.99322	1.4	.0068	
.843	.55447	861	.61272	855	.99324	1.3	.0068	
.844	.56309	862	.62128	856	.99325	1.3	.0068	
2.845	8.57171	863	8.62985	857	0.99326	1.3	1.0068	0.1
.846	.58035	864	.63842	858	.99328	1.3	.0068	
.847	.58899	865	.64701	859	.99329	1.3	.0068	
.848	.59764	866	.65560	860	.99330	1.3	.0067	
.849	.60630	866	.66420	861	.99332	1.3	.0067	
2.850	8.61497	867	8.67281	861	0.99333	1.3	1.0067	0.1
u	tanh u	$\omega F_0'$	sec gd u	$\omega F_0'$	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$

SMITHSONIAN TABLES

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.850	8.61497	867	8.67281	861	0.99333	1.3	1.0067	0.1
.851	.62365	868	.68113	852	.99334	1.3	.0067	
.852	.63233	869	.69006	863	.99336	1.3	.0067	
.853	.64103	870	.69870	854	.99337	1.3	.0067	
.854	.64973	871	.70734	865	.99338	1.3	.0067	
2.855	8.65814	872	8.71600	856	0.99340	1.3	1.0066	0.1
.856	.65716	872	.72466	867	.99341	1.3	.0066	
.857	.66589	873	.73333	858	.99342	1.3	.0066	
.858	.67463	874	.74201	868	.99344	1.3	.0066	
.859	.68337	875	.75070	869	.99345	1.3	.0066	
2.860	8.70213	876	8.75940	870	0.99346	1.3	1.0066	0.1
.861	.71089	877	.76810	871	.99348	1.3	.0066	
.862	.71967	878	.77682	872	.99349	1.3	.0066	
.863	.72845	879	.78554	873	.99350	1.3	.0065	
.864	.73724	879	.79428	874	.99351	1.3	.0065	
2.865	8.74604	880	8.80302	875	0.99353	1.3	1.0065	0.1
.866	.75481	881	.81177	875	.99354	1.3	.0065	
.867	.76366	882	.82053	876	.99355	1.3	.0065	
.868	.77248	883	.82930	877	.99357	1.3	.0065	
.869	.78132	884	.83807	878	.99358	1.3	.0065	
2.870	8.79016	885	8.84686	879	0.99359	1.3	1.0065	0.1
.871	.79901	886	.85565	880	.99360	1.3	.0064	
.872	.80787	885	.86446	881	.99362	1.3	.0064	
.873	.81674	887	.87327	882	.99363	1.3	.0064	
.874	.82562	888	.88209	883	.99364	1.3	.0064	
2.875	8.83450	889	8.89092	883	0.99365	1.3	1.0064	0.1
.876	.84340	890	.89076	884	.99367	1.3	.0064	
.877	.85230	891	.90061	885	.99368	1.3	.0064	
.878	.86122	892	.91046	886	.99369	1.3	.0063	
.879	.87014	893	.92033	887	.99371	1.3	.0063	
2.880	8.87907	894	8.93520	888	0.99372	1.3	1.0063	0.1
.881	.88801	894	.94409	889	.99373	1.3	.0062	
.882	.89696	895	.95298	890	.99374	1.2	.0063	
.883	.90591	896	.96188	891	.99376	1.2	.0063	
.884	.91488	897	.97079	891	.99377	1.2	.0063	
2.885	8.92385	898	8.97971	892	0.99378	1.2	1.0063	0.1
.886	.93281	899	.98864	893	.99379	1.2	.0062	
.887	.94183	900	.99754	894	.99380	1.2	.0062	
.888	.95084	901	9.00652	895	.99382	1.2	.0062	
.889	.95985	902	.01548	896	.99383	1.2	.0062	
2.890	8.96887	903	9.02444	897	0.99384	1.2	1.0062	0.1
.891	.97790	903	.03342	898	.99385	1.2	.0062	
.892	.98693	904	.04240	899	.99387	1.2	.0062	
.893	.99598	905	.05139	900	.99388	1.2	.0062	
.894	9.00504	906	.06039	901	.99389	1.2	.0061	
2.895	9.01410	907	9.06940	901	0.99390	1.2	1.0061	0.1
.896	.02318	908	.07842	902	.99391	1.2	.0061	
.897	.03226	909	.08745	903	.99393	1.2	.0061	
.898	.04135	910	.09648	904	.99394	1.2	.0061	
.899	.05045	911	.10553	905	.99395	1.2	.0061	
2.900	9.05956	911	9.11458	906	0.99396	1.2	1.0061	0.1
$u$	$\tanh u$	$\omega F_0'$	$\sec u$	$\omega F_0'$	$\sin u$	$\omega F_0'$	$\csc u$	$\omega F_0'$

# Natural Hyperbolic Functions.

u	sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	tanh u	$\omega F_0'$	coth u	$\omega F_0'$
2.000	9.05956	911	9.11458	906	0.99396	1,2	1.0061	0,1
.001	.06868	912	.12365	907	.99398	1,2	.0061	
.002	.07781	913	.13272	908	.99399	1,2	.0060	
.003	.08695	914	.14180	909	.99400	1,2	.0060	
.004	.09609	915	.15090	910	.99401	1,2	.0060	
2.005	9.10525	916	9.16000	911	0.99402	1,2	1.0060	0,1
.006	.11441	917	.16911	911	.99403	1,2	.0060	
.007	.12359	918	.17823	912	.99405	1,2	.0060	
.008	.13277	919	.18735	913	.99406	1,2	.0060	
.009	.14196	920	.19649	914	.99407	1,2	.0060	
2.010	9.15116	921	9.20564	915	0.99408	1,2	1.0060	0,1
.011	.16037	921	.21479	916	.99409	1,2	.0059	
.012	.16959	922	.22396	917	.99411	1,2	.0059	
.013	.17882	923	.23313	918	.99412	1,2	.0059	
.014	.18806	924	.24232	919	.99413	1,2	.0059	
2.015	9.19730	925	9.25151	920	0.99414	1,2	1.0059	0,1
.016	.20656	926	.26071	921	.99415	1,2	.0059	
.017	.21583	927	.26992	922	.99416	1,2	.0059	
.018	.22510	928	.27914	923	.99418	1,2	.0059	
.019	.23438	929	.28837	923	.99419	1,2	.0058	
2.020	9.24368	930	9.29761	924	0.99420	1,2	1.0058	0,1
.021	.25298	931	.30686	925	.99421	1,2	.0058	
.022	.26229	932	.31612	926	.99422	1,2	.0058	
.023	.27161	933	.32538	927	.99423	1,1	.0058	
.024	.28094	933	.33466	928	.99425	1,1	.0058	
2.025	9.29028	934	9.34395	929	0.99426	1,1	1.0058	0,1
.026	.29953	935	.35324	930	.99427	1,1	.0058	
.027	.30899	936	.36254	931	.99428	1,1	.0058	
.028	.31835	937	.37185	932	.99429	1,1	.0057	
.029	.32773	938	.38118	933	.99430	1,1	.0057	
2.030	9.33712	939	9.39051	934	0.99531	1,1	1.0057	0,1
.031	.34651	940	.39986	935	.99433	1,1	.0057	
.032	.35592	941	.40921	936	.99434	1,1	.0057	
.033	.36533	942	.41857	937	.99435	1,1	.0057	
.034	.37475	943	.42794	937	.99436	1,1	.0057	
2.035	9.38419	944	9.43732	938	0.99437	1,1	1.0057	0,1
.036	.39363	945	.44671	939	.99438	1,1	.0057	
.037	.40308	946	.45610	940	.99439	1,1	.0056	
.038	.41254	947	.46551	941	.99440	1,1	.0056	
.039	.42201	947	.47493	942	.99441	1,1	.0056	
2.040	9.43149	948	9.48436	943	0.99443	1,1	1.0056	0,1
.041	.44098	949	.49379	944	.99444	1,1	.0056	
.042	.45048	950	.50324	945	.99445	1,1	.0056	
.043	.45999	951	.51269	946	.99446	1,1	.0056	
.044	.46950	952	.52216	947	.99447	1,1	.0056	
2.045	9.47903	953	9.53163	948	0.99448	1,1	1.0055	0,1
.046	.48857	954	.54112	949	.99449	1,1	.0055	
.047	.49811	955	.55061	950	.99450	1,1	.0055	
.048	.50767	956	.56011	951	.99451	1,1	.0055	
.049	.51723	957	.56962	952	.99453	1,1	.0055	
2.050	9.52681	958	9.57915	953	0.99454	1,1	1.0055	0,1
u	tan gd u	$\omega F_0'$	sec gd u	$\omega F_0'$	sin gd u	$\omega F_0'$	csc gd u	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
2.950	9.53681	958	9.57015	953	0.99454	1.1	1.0055	0.1
.951	.53630	959	.58858	954	.99455	1.1	.0055	
.952	.53598	960	.58822	955	.99456	1.1	.0055	
.953	.55559	961	.60777	956	.99457	1.1	.0055	
.954	.50520	962	.61733	957	.99458	1.1	.0055	
2.955	9.57482	963	9.62600	957	0.99459	1.1	1.0054	0.1
.956	.58445	964	.63648	958	.99460	1.1	.0054	
.957	.59110	965	.64607	959	.99461	1.1	.0054	
.958	.60375	966	.65567	960	.99462	1.1	.0054	
.959	.61341	967	.66528	961	.99463	1.1	.0054	
2.960	9.64308	967	9.67490	962	0.99464	1.1	1.0054	0.1
.961	.64376	968	.68452	963	.99465	1.1	.0054	
.962	.64445	969	.69416	964	.99467	1.1	.0054	
.963	.65214	970	.70381	965	.99468	1.1	.0054	
.964	.66185	971	.71347	966	.99469	1.1	.0053	
2.965	9.67157	972	9.72313	967	0.99470	1.1	1.0053	0.1
.966	.68130	973	.73281	968	.99471	1.1	.0053	
.967	.69104	974	.74249	969	.99472	1.1	.0053	
.968	.70078	975	.75219	970	.99473	1.1	.0053	
.969	.71051	976	.76190	971	.99474	1.0	.0053	
2.970	9.72031	977	9.77161	972	0.99475	1.0	1.0053	0.1
.971	.73008	978	.78134	973	.99476	1.0	.0053	
.972	.73987	979	.79107	974	.99477	1.0	.0053	
.973	.74967	980	.80082	975	.99478	1.0	.0052	
.974	.75947	981	.81057	976	.99479	1.0	.0052	
2.975	9.76039	982	9.82034	977	0.99480	1.0	1.0052	0.1
.976	.77011	983	.83011	978	.99481	1.0	.0052	
.977	.78005	984	.83989	979	.99482	1.0	.0052	
.978	.78970	985	.84969	980	.99483	1.0	.0052	
.979	.80035	986	.85949	981	.99484	1.0	.0052	
2.980	9.81051	987	9.86930	982	0.99485	1.0	1.0052	0.1
.981	.82030	988	.87013	983	.99486	1.0	.0052	
.982	.83027	989	.88006	984	.99487	1.0	.0052	
.983	.84016	990	.88986	985	.99488	1.0	.0051	
.984	.85007	991	.90006	986	.99489	1.0	.0051	
2.985	9.86098	992	9.91852	987	0.99490	1.0	1.0051	0.1
.986	.87700	993	.92830	988	.99491	1.0	.0051	
.987	.88781	994	.93828	989	.99492	1.0	.0051	
.988	.89778	995	.94817	990	.99493	1.0	.0051	
.989	.90773	996	.95807	991	.99495	1.0	.0051	
2.990	9.91770	997	9.97698	992	0.99496	1.0	1.0051	0.1
.991	.92767	998	.97791	993	.99497	1.0	.0051	
.992	.93765	999	.98781	994	.99498	1.0	.0051	
.993	.94765	1000	.99778	995	.99499	1.0	.0050	
.994	.95765	1001	10.00774	996	.99500	1.0	.0050	
2.995	9.96766	1002	10.01770	997	0.99501	1.0	1.0050	0.1
.996	.97768	1003	.02767	998	.99502	1.0	.0050	
.997	.98772	1004	.03765	999	.99503	1.0	.0050	
.998	.99776	1005	.04765	1000	.99504	1.0	.0050	
.999	10.00781	1006	.05765	1001	.99504	1.0	.0050	
3.000	10.01787	1007	10.06766	1002	0.99505	1.0	1.0050	0.1
$u$	$\ln \sinh u$	$\omega F_0'$	$\ln \cosh u$	$\omega F_0'$	$\ln \tanh u$	$\omega F_0'$	$\ln \coth u$	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
3.00	10.0179	1007	10.0677	1002	0.00505	0.0	1.0050	1.0
.01	10.1101	1017	10.1683	1012	.00515	0.7	.0010	1.0
.02	10.2212	1027	10.2700	1022	.00525	0.5	.0018	1.0
.03	10.3215	1037	10.3728	1032	.00531	0.3	.0017	0.9
.04	10.4287	1048	10.4765	1043	.00543	0.1	.0016	0.9
3.05	10.5340	1058	10.5811	1053	0.00552	8.0	1.0015	0.9
.06	10.6403	1069	10.6872	1064	.00561	8.8	.0011	0.9
.07	10.7477	1079	10.7943	1075	.00570	8.6	.0013	0.9
.08	10.8562	1090	10.9022	1085	.00578	8.4	.0012	0.8
.09	10.9658	1101	11.0113	1097	.00587	8.2	.0011	0.8
3.10	11.0765	1112	11.1215	1108	0.00595	8.1	1.0011	0.8
.11	11.1882	1123	11.2328	1119	.00601	7.9	.0010	0.8
.12	11.3011	1135	11.3453	1130	.00611	7.8	.0039	0.8
.13	11.4151	1146	11.4588	1142	.00618	7.6	.0038	0.8
.14	11.5303	1157	11.5736	1153	.00626	7.5	.0038	0.8
3.15	11.6465	1169	11.6895	1165	0.00633	7.3	1.0037	0.7
.16	11.7641	1181	11.8065	1176	.00641	7.2	.0030	0.7
.17	11.8827	1192	11.9247	1188	.00648	7.0	.0035	0.7
.18	12.0026	1204	12.0442	1200	.00655	6.9	.0015	0.7
.19	12.1236	1216	12.1648	1212	.00662	6.8	.0014	0.7
3.20	12.2450	1229	12.2865	1225	0.00668	6.6	1.0033	0.7
.21	12.3694	1241	12.4097	1237	.00675	6.5	.0013	0.7
.22	12.4941	1253	12.5340	1249	.00681	6.4	.0013	0.6
.23	12.6200	1266	12.6599	1262	.00688	6.3	.0011	0.6
.24	12.7473	1279	12.7861	1275	.00691	6.1	.0011	0.6
3.25	12.8758	1291	12.9146	1288	0.00700	6.0	1.0030	0.6
.26	13.0056	1304	13.0440	1301	.00706	5.9	.0010	0.6
.27	13.1367	1317	13.1747	1314	.00712	5.8	.0010	0.6
.28	13.2691	1331	13.3067	1327	.00717	5.6	.0018	0.6
.29	13.4028	1344	13.4401	1340	.00723	5.5	.0028	0.6
3.30	13.5379	1357	13.5748	1354	0.00728	5.4	1.0027	0.5
.31	13.6743	1371	13.7108	1367	.00734	5.3	.0027	0.5
.32	13.8121	1385	13.8483	1381	.00739	5.2	.0026	0.5
.33	13.9513	1399	13.9871	1395	.00744	5.1	.0026	0.5
.34	14.0918	1413	14.1273	1409	.00749	5.0	.0025	0.5
3.35	14.2338	1427	14.2689	1423	0.00754	4.9	1.0025	0.5
.36	14.3772	1441	14.4120	1438	.00759	4.8	.0021	0.5
.37	14.5221	1456	14.5565	1452	.00764	4.7	.0021	0.5
.38	14.6684	1470	14.7024	1467	.00768	4.6	.0013	0.5
.39	14.8161	1485	14.8498	1482	.00773	4.5	.0023	0.5
3.40	14.9654	1500	14.9987	1497	0.00777	4.4	1.0022	0.4
.41	15.1161	1515	15.1491	1512	.00782	4.3	.0022	0.4
.42	15.2681	1530	15.3011	1527	.00786	4.3	.0021	0.4
.43	15.4221	1545	15.4545	1542	.00790	4.2	.0021	0.4
.44	15.5774	1561	15.6095	1558	.00795	4.1	.0021	0.4
3.45	15.7343	1577	15.7661	1573	0.00799	4.0	1.0020	0.4
.46	15.8928	1592	15.9242	1589	.00803	3.9	.0020	0.4
.47	16.0528	1608	16.0839	1605	.00807	3.9	.0019	0.4
.48	16.2145	1625	16.2453	1621	.00810	3.8	.0019	0.4
.49	16.3777	1641	16.4082	1638	.00814	3.7	.0019	0.4
3.50	16.5426	1657	16.5728	1654	0.00818	3.6	1.0018	0.4
$u$	$\ln u$	$\omega F_0'$	$\sec u$	$\omega F_0'$	$\sin u$	$\omega F_0'$	$\csc u$	$\omega F_0'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u$	$\coth u$	$\omega F_u'$
3.50	16.5426	1657	16.5738	1654	0.99848	3.6	1.0018	0.4
.51	16.7002	1674	16.7391	1671	.99821	3.6	.0018	0.4
.52	16.8771	1691	16.9070	1688	.99825	3.5	.0018	0.4
.53	17.0473	1708	17.0766	1705	.99838	3.4	.0017	0.3
.54	17.2190	1725	17.2480	1722	.99832	3.4	.0017	0.3
3.55	17.3923	1742	17.4210	1739	0.99835	3.3	1.0017	0.3
.56	17.5674	1760	17.5958	1757	.99838	3.2	.0016	0.3
.57	17.7442	1777	17.7724	1774	.99842	3.2	.0016	0.3
.58	17.9238	1795	17.9507	1792	.99845	3.1	.0016	0.3
.59	18.1034	1813	18.1308	1810	.99848	3.0	.0015	0.3
3.60	18.2855	1831	18.3128	1829	0.99851	3.0	1.0015	0.3
.61	18.4698	1850	18.4966	1847	.99854	2.9	.0015	0.3
.62	18.6554	1868	18.6812	1865	.99857	2.9	.0014	0.3
.63	18.8432	1887	18.8697	1884	.99859	2.8	.0014	0.3
.64	19.0338	1906	19.0590	1903	.99862	2.8	.0014	0.3
3.65	19.2243	1925	19.2503	1922	0.99865	2.7	1.0014	0.3
.66	19.4178	1944	19.4435	1942	.99868	2.6	.0013	0.3
.67	19.6132	1964	19.6387	1961	.99870	2.6	.0013	0.3
.68	19.8106	1984	19.8358	1981	.99873	2.5	.0013	0.3
.69	20.0090	2003	20.0349	2001	.99875	2.5	.0012	0.2
3.70	20.2113	2024	20.2360	2021	0.99878	2.4	1.0012	0.2
.71	20.4147	2044	20.4391	2041	.99880	2.4	.0012	0.2
.72	20.6201	2064	20.6443	2062	.99883	2.3	.0012	0.2
.73	20.8276	2085	20.8516	2083	.99885	2.3	.0012	0.2
.74	21.0371	2106	21.0609	2104	.99887	2.3	.0011	0.2
3.75	21.2488	2127	21.2723	2125	0.99889	2.2	1.0011	0.2
.76	21.4626	2149	21.4859	2146	.99892	2.2	.0011	0.2
.77	21.6785	2170	21.7016	2168	.99894	2.1	.0011	0.2
.78	21.8966	2192	21.9191	2190	.99896	2.1	.0010	0.2
.79	22.1169	2214	22.1395	2212	.99898	2.0	.0010	0.2
3.80	22.3394	2236	22.3618	2234	0.99900	2.0	1.0010	0.2
.81	22.5641	2259	22.5863	2256	.99902	2.0	.0010	0.2
.82	22.7911	2281	22.8131	2279	.99904	1.9	.0010	0.2
.83	23.0204	2304	23.0421	2302	.99905	1.9	.0009	0.2
.84	23.2520	2327	23.2735	2325	.99908	1.8	.0009	0.2
3.85	23.4859	2351	23.5072	2349	0.99909	1.8	1.0009	0.2
.86	23.7221	2374	23.7432	2372	.99911	1.8	.0009	0.2
.87	23.9608	2398	23.9816	2396	.99913	1.7	.0009	0.2
.88	24.2018	2422	24.2224	2420	.99915	1.7	.0009	0.2
.89	24.4452	2447	24.4657	2445	.99916	1.7	.0008	0.2
3.90	24.6911	2471	24.7113	2469	0.99918	1.6	1.0008	0.2
.91	24.9395	2496	24.9595	2494	.99920	1.6	.0008	0.2
.92	25.1903	2521	25.2101	2519	.99921	1.6	.0008	0.2
.93	25.4437	2546	25.4633	2544	.99923	1.5	.0008	0.2
.94	25.6996	2572	25.7190	2570	.99924	1.5	.0008	0.2
3.95	25.9581	2598	25.9773	2596	0.99926	1.5	1.0007	0.1
.96	26.2191	2624	26.2382	2622	.99927	1.5	.0007	0.1
.97	26.4828	2650	26.5017	2648	.99929	1.4	.0007	0.1
.98	26.7492	2677	26.7679	2675	.99930	1.4	.0007	0.1
.99	27.0182	2704	27.0367	2702	.99932	1.4	.0007	0.1
4.00	27.2899	2731	27.3082	2729	0.99933	1.3	1.0007	0.1
$u$	$\tanh u$	$\omega F_u'$	$\csc u$	$\omega F_u'$	$\sin u$	$\omega F_u'$	$\sec u$	$\omega F_u'$



# Natural Hyperbolic Functions.

u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$
4.00	27.2899	2731	27.3082	2729	0.00033	1.3	1.0007	0.1
.01	27.5011	2758	27.5825	2756	.00034	1.3	.0007	
.02	27.8116	2786	27.8505	2784	.00035	1.3	.0008	
.03	28.1216	2811	28.1303	2812	.00037	1.3	.0008	
.04	28.4314	2842	28.4220	2840	.00038	1.3	.0009	
4.05	28.6900	2871	28.7071	2869	0.00039	1.2	1.0006	0.1
.06	28.9785	2900	28.9958	2898	.00041	1.2	.0006	
.07	29.2669	2929	29.2870	2927	.00042	1.2	.0005	
.08	29.5643	2958	29.5812	2956	.00043	1.1	.0005	
.09	29.8616	2988	29.8783	2986	.00044	1.1	.0006	
4.10	30.1619	3018	30.1781	3016	0.00045	1.1	1.0005	0.1
.11	30.4652	3048	30.4816	3047	.00046	1.1	.0005	
.12	30.7715	3079	30.7877	3077	.00047	1.1	.0005	
.13	31.0809	3110	31.0970	3108	.00048	1.0	.0005	
.14	31.3934	3141	31.4094	3139	.00049	1.0	.0005	
4.15	31.7091	3172	31.7249	3171	0.00050	1.0	1.0005	0.1
.16	32.0280	3204	32.0430	3203	.00051	1.0	.0005	
.17	32.3500	3237	32.3655	3235	.00052	1.0	.0005	
.18	32.6753	3269	32.6906	3268	.00053	0.9	.0005	
.19	33.0038	3302	33.0190	3300	.00054	0.9	.0005	
4.20	33.3357	3335	33.3507	3334	0.00055	0.9	1.0004	0.1
.21	33.6708	3369	33.6857	3367	.00056	0.9	.0004	
.22	34.0094	3402	34.0241	3401	.00057	0.9	.0004	
.23	34.3513	3437	34.3659	3435	.00058	0.8	.0004	
.24	34.6967	3471	34.7111	3470	.00058	0.8	.0004	
4.25	35.0456	3506	35.0598	3505	0.00059	0.8	1.0004	0.1
.26	35.3979	3541	35.4121	3540	.00060	0.8	.0004	
.27	35.7538	3577	35.7678	3575	.00061	0.8	.0004	
.28	36.1133	3613	36.1271	3611	.00062	0.8	.0004	
.29	36.4764	3649	36.4901	3648	.00062	0.8	.0004	
4.30	36.8431	3686	36.8567	3681	0.00063	0.7	1.0004	0.1
.31	37.2135	3723	37.2270	3721	.00064	0.7	.0004	
.32	37.5877	3760	37.6010	3759	.00065	0.7	.0004	
.33	37.9656	3798	37.9787	3797	.00065	0.7	.0003	
.34	38.3473	3836	38.3603	3835	.00066	0.7	.0003	
4.35	38.7328	3875	38.7457	3873	0.00067	0.7	1.0003	0.1
.36	39.1222	3913	39.1350	3912	.00067	0.7	.0003	
.37	39.5155	3953	39.5281	3952	.00068	0.6	.0003	
.38	39.9128	3993	39.9253	3991	.00069	0.6	.0003	
.39	40.3140	4033	40.3264	4031	.00069	0.6	.0003	
4.40	40.7193	4073	40.7316	4072	0.00070	0.6	1.0003	0.1
.41	41.1287	4114	41.1408	4113	.00070	0.6	.0003	
.42	41.5421	4155	41.5542	4154	.00071	0.6	.0003	
.43	41.9598	4197	41.9717	4196	.00072	0.6	.0003	
.44	42.3816	4239	42.3934	4238	.00072	0.6	.0003	
4.45	42.8076	4282	42.8193	4281	0.00073	0.5	1.0003	0.1
.46	43.2380	4325	43.2495	4324	.00073	0.5	.0003	
.47	43.6726	4368	43.6841	4367	.00074	0.5	.0003	
.48	44.1117	4412	44.1230	4411	.00074	0.5	.0003	
.49	44.5551	4457	44.5663	4456	.00075	0.5	.0003	
4.50	45.0030	4501	45.0141	4500	0.00075	0.5	1.0002	0.0
u	sinh u	$\omega F_u'$	cosh u	$\omega F_u'$	tanh u	$\omega F_u'$	coth u	$\omega F_u'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$
4.50	45.0030	.4501	45.0141	.4500	0.99975	0.5	1.0002	0.0
.51	45.1554	.4517	45.1664	.4516	.99976	0.5	.0002	
.52	45.3124	.4532	45.3232	.4531	.99976	0.5	.0002	
.53	45.4739	.4548	45.4847	.4547	.99977	0.5	.0002	
.54	45.6401	.4565	45.6507	.4564	.99977	0.5	.0002	
4.55	47.3109	.4732	47.3215	.4731	0.99978	0.4	1.0002	0.0
.56	47.4865	.4749	47.4970	.4749	.99978	0.4	.0002	
.57	48.3669	.4838	48.3772	.4837	.99979	0.4	.0002	
.58	48.7541	.4876	48.7623	.4875	.99979	0.4	.0002	
.59	49.2441	.4925	49.2523	.4924	.99979	0.4	.0002	
4.60	49.7371	.4975	49.7472	.4974	0.99980	0.4	1.0002	0.0
.61	50.1371	.5025	50.1471	.5024	.99980	0.4	.0002	
.62	50.7421	.5075	50.7519	.5074	.99981	0.4	.0002	
.63	51.2542	.5126	51.2619	.5125	.99981	0.4	.0002	
.64	51.7673	.5178	51.7770	.5177	.99981	0.4	.0002	
4.65	52.3877	.5239	52.3973	.5239	0.99982	0.4	1.0002	0.0
.66	52.8133	.5282	52.8228	.5281	.99982	0.4	.0002	
.67	53.3442	.5335	53.3536	.5334	.99982	0.4	.0002	
.68	53.8804	.5389	53.8897	.5388	.99983	0.3	.0002	
.69	54.4220	.5443	54.4312	.5442	.99983	0.3	.0002	
4.70	54.9690	.5498	54.9781	.5497	0.99983	0.3	1.0002	0.0
.71	55.5216	.5553	55.5305	.5552	.99984	0.3	.0002	
.72	56.0797	.5609	56.0886	.5608	.99984	0.3	.0002	
.73	56.6434	.5665	56.6522	.5664	.99984	0.3	.0002	
.74	57.2127	.5722	57.2215	.5721	.99985	0.3	.0002	
4.75	57.7878	.5780	57.7965	.5779	0.99985	0.3	1.0001	0.0
.76	58.3687	.5838	58.3772	.5837	.99985	0.3	.0001	
.77	58.9554	.5896	58.9639	.5895	.99985	0.3	.0001	
.78	59.5480	.5956	59.5564	.5955	.99985	0.3	.0001	
.79	60.1465	.6015	60.1548	.6015	.99985	0.3	.0001	
4.80	60.7511	.6076	60.7593	.6075	0.99986	0.3	1.0001	0.0
.81	61.3617	.6137	61.3699	.6136	.99987	0.3	.0001	
.82	61.9783	.6199	61.9866	.6198	.99987	0.3	.0001	
.83	62.6015	.6261	62.6095	.6260	.99987	0.3	.0001	
.84	63.2307	.6324	63.2386	.6323	.99987	0.3	.0001	
4.85	63.8663	.6387	63.8741	.6387	0.99988	0.2	1.0001	0.0
.86	64.5082	.6452	64.5160	.6451	.99988	0.2	.0001	
.87	65.1566	.6516	65.1643	.6516	.99988	0.2	.0001	
.88	65.8115	.6582	65.8191	.6581	.99988	0.2	.0001	
.89	66.4730	.6648	66.4805	.6647	.99989	0.2	.0001	
4.90	67.1412	.6715	67.1486	.6714	0.99989	0.2	1.0001	0.0
.91	67.8160	.6782	67.8234	.6782	.99989	0.2	.0001	
.92	68.4977	.6850	68.5050	.6850	.99989	0.2	.0001	
.93	69.1861	.6919	69.1934	.6919	.99990	0.2	.0001	
.94	69.8815	.6989	69.8887	.6988	.99990	0.2	.0001	
4.95	70.5839	.7059	70.5910	.7058	0.99990	0.2	1.0001	0.0
.96	71.2931	.7130	71.3001	.7129	.99990	0.2	.0001	
.97	72.0100	.7202	72.0169	.7201	.99990	0.2	.0001	
.98	72.7338	.7274	72.7406	.7273	.99991	0.2	.0001	
.99	73.4648	.7347	73.4716	.7346	.99991	0.2	.0001	
5.00	74.2033	.7421	74.2099	.7420	0.99991	0.2	1.0001	0.0
$u$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$

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$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$
5.00	74.2032	7421	74.2039	7420	0.00000	0.0	1.00000	0.0
.01	74.0130	7403	74.0557	7405	.000001	14.2	.00001	.0001
.02	75.7023	7571	75.7080	7570	.000001	0.2	.00001	.0001
.03	76.4632	7647	76.4698	7646	.000001	0.2	.00001	.0001
.04	77.2368	7724	77.2382	7723	.000002	0.2	.00001	.0001
5.05	78.0080	7801	78.0141	7801	0.00002	0.2	1.00001	.001
.06	78.7020	7880	78.7081	7870	.000002	14.2	.00001	.0001
.07	79.5840	7950	79.5903	7958	.000002	0.2	.00001	.0001
.08	80.3830	8030	80.3901	8038	.000002	0.2	.00001	.0001
.09	81.1918	8120	81.1980	8119	.000002	0.2	.00001	.0001
5.10	82.0070	8201	82.0140	8201	0.00003	0.1	1.00001	0.001
.11	82.8322	8281	82.8382	8281	.000003	0.1	.00001	.0001
.12	83.6647	8367	83.6707	8366	.000003	0.1	.00001	.0001
.13	84.5056	8451	84.5115	8451	.000003	0.1	.00001	.0001
.14	85.3550	8536	85.3608	8535	.000003	0.1	.00001	.0001
5.15	86.2128	8622	86.2186	8621	0.00003	0.1	1.00001	0.001
.16	87.0794	8700	87.0851	8706	.000003	0.1	.00001	.0001
.17	87.9546	8796	87.9603	8795	.000003	0.1	.00001	.0001
.18	88.8386	8881	88.8442	8881	.000003	0.1	.00001	.0001
.19	89.7315	8971	89.7371	8973	.000004	0.1	.00001	.0001
5.20	90.6331	9061	90.6389	9063	0.00004	0.1	1.00001	0.001
.21	91.5443	9155	91.5503	9151	.000004	14.1	.00001	.0001
.22	92.4641	9247	92.4708	9246	.000004	14.1	.00001	.0001
.23	93.3937	9340	93.3991	9339	.000004	0.1	.00001	.0001
.24	94.3324	9431	94.3377	9433	.000004	0.1	.00001	.0001
5.25	95.2805	9530	95.2858	9528	0.00004	0.1	1.00001	0.001
.26	96.2381	9621	96.2433	9621	.000005	0.1	.00001	.0001
.27	97.2053	9721	97.2106	9721	.000005	0.1	.00001	.0001
.28	98.1824	9810	98.1875	9818	.000005	0.1	.00001	.0001
.29	99.1692	9917	99.1742	9917	.000005	0.1	.00001	.0001
5.30	100.1659	10017	100.1709	10017	0.00005	0.1	1.00001	0.001
.31	101.1726	10118	101.1776	10117	.000005	0.1	.00001	.0001
.32	102.1895	10219	102.1944	10219	.000005	0.1	.00001	.0001
.33	103.2166	10322	103.2214	10322	.000005	0.1	.00001	.0001
.34	104.2540	10426	104.2588	10425	.000005	0.1	.00001	.0001
5.35	105.3018	10531	105.3065	10530	0.00005	0.1	1.00001	0.001
.36	106.3601	10636	106.3648	10636	.000006	0.1	.00001	.0001
.37	107.4291	10743	107.4338	10743	.000006	0.1	.00001	.0001
.38	108.5088	10851	108.5134	10851	.000006	0.1	.00001	.0001
.39	109.5991	10960	109.6040	10960	.000006	0.1	.00001	.0001
5.40	110.7009	11071	110.7058	11070	0.00006	0.1	1.00001	0.001
.41	111.8136	11182	111.8186	11181	.000006	0.1	.00001	.0001
.42	112.9375	11291	112.9418	11291	.000006	0.1	.00001	.0001
.43	114.0724	11408	114.0768	11407	.000006	0.1	.00001	.0001
.44	115.2189	11522	115.2233	11522	.000006	0.1	.00001	.0001
5.45	116.3769	11638	116.3812	11638	0.00006	0.1	1.00001	0.001
.46	117.5466	11755	117.5508	11755	.000006	0.1	.00001	.0001
.47	118.7280	11873	118.7322	11873	.000006	0.1	.00001	.0001
.48	119.9213	11993	119.9254	11992	.000007	0.1	.00001	.0001
.49	121.1265	12113	121.1307	12113	.000007	0.1	.00001	.0001
5.50	122.3439	12235	122.3480	12234	0.00007	14.1	1.00001	0.001
$u$	$\sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\tanh u$	$\omega F_u'$	$\coth u$	$\omega F_u'$

# Natural Hyperbolic Functions.

$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\tanh u$	$\omega F_0'$	$\coth u$	$\omega F_0'$
5.50	122.3439	12235	122.3480	12234	0.99997	0,1	1.0000	0,0
.51	123.5735	12358	123.5776	12357	.99997	0,1	.0000	
.52	124.8155	12484	124.8195	12482	.99997	0,1	.0000	
.53	126.0700	12607	126.0739	12607	.99997	0,1	.0000	
.54	127.3370	12734	127.3410	12734	.99997	0,1	.0000	
5.55	128.6168	12862	128.6207	12862	0.99997	0,1	1.0000	0,0
.56	129.9095	12991	129.9133	12991	.99997	0,1	.0000	
.57	131.2151	13122	131.2190	13122	.99997	0,1	.0000	
.58	132.5339	13254	132.5377	13253	.99997	0,1	.0000	
.59	133.8659	13387	133.8697	13387	.99997	0,1	.0000	
5.60	135.2114	13522	135.2150	13521	0.99997	0,1	1.0000	0,0
.61	136.5703	13657	136.5739	13657	.99997	0,1	.0000	
.62	137.9429	13795	137.9465	13794	.99997	0,1	.0000	
.63	139.3203	13933	139.3239	13933	.99997	0,1	.0000	
.64	140.7026	14073	140.7061	14073	.99997	0,1	.0000	
5.65	142.1440	14215	142.1475	14214	0.99998	0,0	1.0000	0,0
.66	143.5736	14358	143.5771	14357	.99998	0,0	.0000	
.67	145.0155	14502	145.0190	14502	.99998	0,0	.0000	
.68	146.4730	14648	146.4764	14647	.99998	0,0	.0000	
.69	147.9451	14795	147.9485	14795	.99998	0,0	.0000	
5.70	149.4320	14944	149.4354	14943	0.99998	0,0	1.0000	0,0
.71	150.9330	15094	150.9372	15093	.99998	0,0	.0000	
.72	152.4508	15245	152.4541	15245	.99998	0,0	.0000	
.73	153.9830	15399	153.9863	15398	.99998	0,0	.0000	
.74	155.5300	15553	155.5338	15553	.99998	0,0	.0000	
5.75	157.0938	15710	157.0969	15709	0.99998	0,0	1.0000	0,0
.76	158.6726	15868	158.6757	15867	.99998	0,0	.0000	
.77	160.2673	16027	160.2704	16027	.99998	0,0	.0000	
.78	161.8781	16188	161.8811	16188	.99998	0,0	.0000	
.79	163.5050	16351	163.5080	16350	.99998	0,0	.0000	
5.80	165.1484	16515	165.1513	16515	0.99998	0,0	1.0000	0,0
.81	166.8081	16681	166.8111	16681	.99998	0,0	.0000	
.82	168.4845	16840	168.4875	16840	.99998	0,0	.0000	
.83	170.1770	17018	170.1800	17018	.99998	0,0	.0000	
.84	171.8852	17189	171.8882	17189	.99998	0,0	.0000	
5.85	173.6158	17362	173.6186	17362	0.99998	0,0	1.0000	0,0
.86	175.3600	17536	175.3635	17536	.99998	0,0	.0000	
.87	177.1231	17713	177.1259	17712	.99998	0,0	.0000	
.88	178.9032	17891	178.9060	17890	.99998	0,0	.0000	
.89	180.7013	18070	180.7040	18070	.99998	0,0	.0000	
5.90	182.5174	18252	182.5201	18252	0.99998	0,0	1.0000	0,0
.91	184.3517	18435	184.3544	18435	.99999	0,0	.0000	
.92	186.2045	18621	186.2072	18620	.99999	0,0	.0000	
.93	188.0759	18808	188.0785	18808	.99999	0,0	.0000	
.94	189.9661	18997	189.9688	18997	.99999	0,0	.0000	
5.95	191.8754	19188	191.8780	19188	0.99999	0,0	1.0000	0,0
.96	193.8038	19381	193.8064	19380	.99999	0,0	.0000	
.97	195.7516	19575	195.7541	19575	.99999	0,0	.0000	
.98	197.7180	19772	197.7214	19772	.99999	0,0	.0000	
.99	199.7061	19971	199.7086	19971	.99999	0,0	.0000	
6.00	201.7132	20172	201.7156	20171	0.99999	0,0	1.0000	0,0
$u$	$\tanh u$	$\omega F_0'$	$\operatorname{sech} u$	$\omega F_0'$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$



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**TABLE III**

**NATURAL AND LOGARITHMIC CIRCULAR FUNCTIONS**

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**Circular Functions.**

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$\theta$
0.0000	0.00000	10,0	1.00000	0,0	— ∞	— ∞	0.00000	0,0	0 00 00.00
.0001	.00010		.00000		6.00000	43.429.4	.00000		0 00 20.63
.0002	.00020		.00000		.30103	2171.17	.00000		0 00 41.25
.0003	.00030		.00000		.47712	14176.5	.00000		0 01 01.88
.0004	.00040		.00000		.60206	10857.4	.00000		0 01 22.51
0.0005	0.00050	10,0	1.00000	0,0	6.60807	3885.9	0.00000	0,0	0 01 43.13
.0006	.00060		.00000		.77815	7.38.2	.00000		0 02 03.76
.0007	.00070		.00000		.81510	6.264.3	.00000		0 02 24.30
.0008	.00080		.00000		.90309	5.1.8.7	.00000		0 02 45.01
.0009	.00090		.00000		.95424	4825.5	.00000		0 03 05.64
0.0010	0.00100	10,0	1.00000	0,0	7.00000	4342.9	0.00000	0,0	0 03 26.26
.0011	.00110		.00000		.04139	3918.1	.00000		0 03 46.89
.0012	.00120		.00000		.07918	3049.1	.00000		0 04 07.52
.0013	.00130		.00000		.11304	3349.7	.00000		0 04 28.14
.0014	.00140		.00000		.14161	3102.1	.00000		0 04 48.77
0.0015	0.00150	10,0	1.00000	0,0	7.17600	2895.3	0.00000	0,0	0 05 09.40
.0016	.00160		.00000		.20412	2714.3	.00000		0 05 30.02
.0017	.00170		.00000		.23015	3554.7	.00000		0 05 50.05
.0018	.00180		.00000		.25527	2412.7	.00000		0 06 11.38
.0019	.00190		.00000		.27875	2285.8	.00000		0 06 31.90
0.0020	0.00200	10,0	1.00000	0,0	7.30103	2171.5	0.00000	0,0	0 06 52.53
.0021	.00210		.00000		.32222	2088.1	.00000		0 07 13.16
.0022	.00220		.00000		.34242	1974.1	.00000		0 07 33.78
.0023	.00230		.00000		.36173	1888.2	.00000		0 07 54.41
.0024	.00240		.00000		.38021	1809.6	.00000		0 08 15.04
0.0025	0.00250	10,0	1.00000	0,0	7.39794	1737.2	0.00000	0,0	0 08 35.66
.0026	.00260		.00000		.41492	1670.4	.00000		0 08 56.29
.0027	.00270		.00000		.43130	1608.5	.00000		0 09 16.91
.0028	.00280		.00000		.44716	1551.0	.00000		0 09 37.54
.0029	.00290		.00000		.46240	1497.6	.00000		0 09 58.17
0.0030	0.00300	10,0	1.00000	0,0	7.47712	1417.6	0.00000	0,0	0 10 18.79
.0031	.00310		.00000		.49136	1400.9	.00000		0 10 39.42
.0032	.00320		.00000		.50515	1352.2	.00000		0 11 00.05
.0033	.00330		.00000		.51851	1316.0	.00000		0 11 20.67
.0034	.00340		.00000		.53148	1277.3	.00000		0 11 41.30
0.0035	0.00350	10,0	0.99999	0,0	7.54407	1240.8	0.00000	0,0	0 12 01.93
.0036	.00360		.99999		.55630	1205.4	.00000		0 12 22.55
.0037	.00370		.99999		.56820	1173.8	.00000		0 12 43.18
.0038	.00380		.99999		.57978	1142.9	.00000		0 13 03.81
.0039	.00390		.99999		.59103	1113.6	.00000		0 13 24.43
0.0040	0.00400	10,0	0.99999	0,0	7.66205	1085.7	0.00000	0,0	0 13 45.06
.0041	.00410		.99999		.61278	1059.3	.00000		0 14 05.69
.0042	.00420		.99999		.62325	1034.0	.00000		0 14 26.31
.0043	.00430		.99999		.63347	1010.0	.00000		0 14 46.94
.0044	.00440		.99999		.64345	987.0	.00000		0 15 07.57
0.0045	0.00450	10,0	0.99999	0,0	7.65321	965.1	0.00000	0,0	0 15 28.19
.0046	.00460		.99999		.66276	944.1	.00000		0 15 48.82
.0047	.00470		.99999		.67210	924.0	.00000		0 16 09.44
.0048	.00480		.99999		.68124	904.8	.00000		0 16 30.07
.0049	.00490		.99999		.69019	886.3	.00000		0 16 50.70
0.0050	0.00500	10,0	0.99999	0,0	7.66897	868.6	0.00000	0,0	0 17 11.32
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0050	0.00500	10.0	0.99999	0.0	7.69897	868.6	9.99999	0.0	0° 17' 11.32"
.0051	.00510		.99999	0.1	.70757	851.6	.99999		0 17 31.95
.0052	.00520		.99999		.71600	835.2	.99999		0 17 52.58
.0053	.00530		.99999		.72447	819.4	.99999		0 18 13.20
.0054	.00540		.99999		.73239	804.2	.99999		0 18 33.83
0.0055	0.00550	10.0	0.99998	0.1	7.74036	789.6	9.99999	0.0	0 18 54.46
.0056	.00560		.99998		.74849	775.5	.99999		0 19 15.08
.0057	.00570		.99998		.75647	761.9	.99999		0 19 35.71
.0058	.00580		.99998		.76343	748.8	.99999		0 19 56.34
.0059	.00590		.99998		.77035	736.1	.99999		0 20 16.96
0.0060	0.00600	10.0	0.99998	0.1	7.77815	723.8	9.99999	0.0	0 20 37.59
.0061	.00610		.99998		.78533	711.9	.99999		0 20 58.22
.0062	.00620		.99998		.79239	700.5	.99999		0 21 18.84
.0063	.00630		.99998		.79934	689.3	.99999		0 21 39.47
.0064	.00640		.99998		.80618	678.5	.99999		0 22 00.09
0.0065	0.00650	10.0	0.99998	0.1	7.81291	668.1	9.99999	0.0	0 22 20.72
.0066	.00660		.99998		.81954	658.0	.99999		0 22 41.35
.0067	.00670		.99998		.82607	648.2	.99999		0 23 01.97
.0068	.00680		.99998		.83251	638.7	.99999		0 23 22.60
.0069	.00690		.99998		.83885	629.4	.99999		0 23 43.23
0.0070	0.00700	10.0	0.99998	0.1	7.84509	620.4	9.99999	0.0	0 24 03.85
.0071	.00710		.99997		.85125	611.7	.99999		0 24 24.48
.0072	.00720		.99997		.85733	603.2	.99999		0 24 45.11
.0073	.00730		.99997		.86334	594.9	.99999		0 25 05.73
.0074	.00740		.99997		.86923	585.9	.99999		0 25 26.36
0.0075	0.00750	10.0	0.99997	0.1	7.87506	579.0	9.99999	0.0	0 25 46.99
.0076	.00760		.99997		.88081	571.4	.99999		0 26 07.61
.0077	.00770		.99997		.88649	564.0	.99999		0 26 28.24
.0078	.00780		.99997		.89209	556.8	.99999		0 26 48.87
.0079	.00790		.99997		.89762	549.7	.99999		0 27 09.49
0.0080	0.00800	10.0	0.99997	0.1	7.90300	542.9	9.99999	0.0	0 27 30.12
.0081	.00810		.99997		.90848	536.2	.99999		0 27 50.74
.0082	.00820		.99997		.91381	529.6	.99999		0 28 11.37
.0083	.00830		.99997		.91907	523.2	.99999		0 28 32.00
.0084	.00840		.99996		.92427	517.0	.99998		0 28 52.62
0.0085	0.00850	10.0	0.99996	0.1	7.92941	510.9	9.99998	0.0	0 29 13.25
.0086	.00860		.99996		.93449	505.0	.99998		0 29 33.88
.0087	.00870		.99996		.93951	499.1	.99998		0 29 54.50
.0088	.00880		.99996		.94448	493.5	.99998		0 30 15.13
.0089	.00890		.99996		.94938	488.0	.99998		0 30 35.76
0.0090	0.00900	10.0	0.99996	0.1	7.95424	482.5	9.99998	0.0	0 30 56.38
.0091	.00910		.99996		.95904	477.2	.99998		0 31 17.01
.0092	.00920		.99996		.96378	472.0	.99998		0 31 37.64
.0093	.00930		.99996		.96848	467.0	.99998		0 31 58.26
.0094	.00940		.99995		.97312	462.0	.99998		0 32 18.89
0.0095	0.00950	10.0	0.99995	0.1	7.97772	457.1	9.99998	0.0	0 32 39.52
.0096	.00960		.99995		.98226	452.4	.99998		0 33 00.14
.0097	.00970		.99995		.98676	447.7	.99998		0 33 20.77
.0098	.00980		.99995		.99122	443.1	.99998		0 33 41.40
.0099	.00990		.99995		.99563	438.7	.99998		0 34 02.02
0.0100	0.01000	10.0	0.99995	0.1	7.99999	434.3	9.99998	0.0	0 34 22.65
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$



## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0''$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0''$	$u$
0.0100	0.01000	10.0	0.99995	0.1	7.083099	-444.3	9.000008	0.0	0.34 22.05
0.0101	0.01010		0.99995		8.001330	-430.0	0.000023		0.31 43.27
0.0102	0.01020		0.99995		0.00850	-415.8	0.000038		0.35 03.00
0.0103	0.01030		0.99995		0.01283	-401.6	0.000053		0.35 24.53
0.0104	0.01040		0.99995		0.01703	-387.0	0.000068		0.35 45.15
0.0105	0.01050	10.0	0.99994	0.1	8.01118	-413.6	9.000008	0.0	0.36 05.78
0.0106	0.01060		0.99994		0.02530	-400.7	0.000023		0.36 26.41
0.0107	0.01070		0.99994		0.03038	-385.9	0.000038		0.36 47.03
0.0108	0.01080		0.99994		0.03442	-371.1	0.000053		0.37 07.66
0.0109	0.01090		0.99994		0.03742	-356.4	0.000068		0.37 28.29
0.0110	0.01100	10.0	0.99991	0.1	8.01138	-394.8	9.000007	0.0	0.37 48.91
0.0111	0.01110		0.99991		0.04531	-381.2	0.000022		0.38 09.54
0.0112	0.01120		0.99991		0.04931	-367.7	0.000037		0.38 30.17
0.0113	0.01130		0.99991		0.05307	-354.3	0.000052		0.38 50.79
0.0114	0.01140		0.99991		0.05690	-340.9	0.000067		0.39 11.42
0.0115	0.01150	10.0	0.99993	0.1	8.05060	-377.6	9.000007	0.0	0.39 32.05
0.0116	0.01160		0.99993		0.06145	-374.4	0.000022		0.39 52.67
0.0117	0.01170		0.99993		0.06468	-371.2	0.000037		0.40 13.30
0.0118	0.01180		0.99993		0.07187	-358.0	0.000052		0.40 33.92
0.0119	0.01190		0.99993		0.07554	-344.9	0.000067		0.40 54.55
0.0120	0.01200	10.0	0.99993	0.1	8.07017	-361.9	9.000007	0.1	0.41 15.18
0.0121	0.01210		0.99993		0.08477	-358.0	0.000022		0.41 35.80
0.0122	0.01220		0.99993		0.08945	-350.0	0.000037		0.41 56.43
0.0123	0.01230		0.99994		0.08889	-353.1	0.000052		0.42 17.05
0.0124	0.01240		0.99994		0.09441	-350.2	0.000067		0.42 37.68
0.0125	0.01250	10.0	0.99993	0.1	8.00090	-347.4	9.000007	0.1	0.42 58.31
0.0126	0.01260		0.99994		0.10036	-344.7	0.000022		0.43 18.94
0.0127	0.01270		0.99994		0.10470	-342.0	0.000037		0.43 39.56
0.0128	0.01280		0.99994		0.10720	-339.3	0.000052		0.44 00.19
0.0129	0.01290		0.99994		0.11058	-335.6	0.000067		0.44 20.82
0.0130	0.01300	10.0	0.99992	0.1	8.11393	-334.1	9.000006	0.1	0.44 41.44
0.0131	0.01310		0.99991		0.11726	-331.5	0.000021		0.45 02.07
0.0132	0.01320		0.99991		0.12050	-329.0	0.000036		0.45 22.70
0.0133	0.01330		0.99991		0.12381	-326.5	0.000051		0.45 43.32
0.0134	0.01340		0.99991		0.12709	-324.1	0.000066		0.46 03.95
0.0135	0.01350	10.0	0.99991	0.1	8.13032	-324.7	9.000006	0.1	0.46 24.57
0.0136	0.01360		0.99991		0.13353	-319.3	0.000021		0.46 45.20
0.0137	0.01370		0.99991		0.13671	-317.0	0.000036		0.47 05.83
0.0138	0.01380		0.99990		0.13987	-314.7	0.000051		0.47 26.45
0.0139	0.01390		0.99990		0.14300	-312.4	0.000066		0.47 47.08
0.0140	0.01400	10.0	0.99990	0.1	8.14611	-310.2	9.000006	0.1	0.48 07.71
0.0141	0.01410		0.99990		0.14920	-308.0	0.000021		0.48 28.33
0.0142	0.01420		0.99990		0.15227	-305.8	0.000036		0.48 48.96
0.0143	0.01430		0.99990		0.15532	-303.7	0.000051		0.49 09.59
0.0144	0.01440		0.99990		0.15835	-301.6	0.000066		0.49 30.21
0.0145	0.01450	10.0	0.99989	0.1	8.16135	-299.5	9.000005	0.1	0.49 50.84
0.0146	0.01460		0.99989		0.16431	-297.4	0.000020		0.50 11.47
0.0147	0.01470		0.99989		0.16730	-295.4	0.000035		0.50 32.09
0.0148	0.01480		0.99989		0.17025	-293.4	0.000050		0.50 52.72
0.0149	0.01490		0.99989		0.17317	-291.5	0.000065		0.51 13.35
0.0150	0.01500	10.0	0.99989	0.1	8.17608	-289.5	9.000005	0.1	0.51 33.97
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0''$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0''$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0150	0.01500	10.0	0.99989	0.1	8.17608	280.5	9.99995	0.1	0° 51' 33.97
.0151	.01510		.99989	0.2	.17893	287.6	.99995		0 51 54.60
.0152	.01520		.99988		.18183	285.7	.99995		0 52 15.23
.0153	.01530		.99988		.18467	283.8	.99995		0 52 35.85
.0154	.01540		.99988		.18750	282.0	.99995		0 52 56.48
0.0155	0.01550	10.0	0.99988	0.2	8.19031	280.2	9.99995	0.1	0 53 17.10
.0156	.01560		.99988		.19311	278.4	.99995		0 53 37.73
.0157	.01570		.99988		.19588	276.6	.99995		0 53 58.36
.0158	.01580		.99988		.19864	274.9	.99995		0 54 18.98
.0159	.01590		.99987		.20138	273.1	.99995		0 54 39.61
0.0160	0.01600	10.0	0.99987	0.2	8.20410	271.4	9.99994	0.1	0 55 00.24
.0161	.01610		.99987		.20681	269.7	.99994		0 55 20.86
.0162	.01620		.99987		.20950	268.1	.99994		0 55 41.49
.0163	.01630		.99987		.21217	266.4	.99994		0 56 02.12
.0164	.01640		.99987		.21482	264.8	.99994		0 56 22.74
0.0165	0.01650	10.0	0.99986	0.2	8.21746	263.2	9.99994	0.1	0 56 43.37
.0166	.01660		.99986		.22009	261.6	.99994		0 57 04.00
.0167	.01670		.99986		.22270	260.0	.99994		0 57 24.62
.0168	.01680		.99986		.22529	258.5	.99994		0 57 45.25
.0169	.01690		.99986		.22787	257.0	.99994		0 58 05.88
0.0170	0.01700	10.0	0.99986	0.2	8.23043	255.4	9.99994	0.1	0 58 26.50
.0171	.01710		.99985		.23298	253.9	.99994		0 58 47.13
.0172	.01720		.99985		.23551	252.5	.99994		0 59 07.75
.0173	.01730		.99985		.23802	251.0	.99994		0 59 28.38
.0174	.01740		.99985		.24053	249.6	.99993		0 59 49.01
0.0175	0.01750	10.0	0.99985	0.2	8.24302	248.1	9.99993	0.1	1 00 09.63
.0176	.01760		.99985		.24549	246.7	.99993		1 00 30.26
.0177	.01770		.99984		.24795	245.3	.99993		1 00 50.89
.0178	.01780		.99984		.25040	244.0	.99993		1 01 11.51
.0179	.01790		.99984		.25283	242.6	.99993		1 01 32.14
0.0180	0.01800	10.0	0.99984	0.2	8.25525	241.2	9.99993	0.1	1 01 52.77
.0181	.01810		.99984		.25766	239.9	.99993		1 02 13.39
.0182	.01820		.99983		.26005	238.6	.99993		1 02 34.02
.0183	.01830		.99983		.26243	237.3	.99993		1 02 54.65
.0184	.01840		.99983		.26479	236.0	.99993		1 03 15.27
0.0185	0.01850	10.0	0.99983	0.2	8.26715	234.7	9.99993	0.1	1 03 35.90
.0186	.01860		.99983		.26949	233.5	.99992		1 03 56.53
.0187	.01870		.99983		.27182	232.2	.99992		1 04 17.15
.0188	.01880		.99982		.27413	231.0	.99992		1 04 37.78
.0189	.01890		.99982		.27641	229.8	.99992		1 04 58.40
0.0190	0.01900	10.0	0.99982	0.2	8.27873	228.5	9.99992	0.1	1 05 19.03
.0191	.01910		.99982		.28101	227.4	.99992		1 05 39.66
.0192	.01920		.99982		.28327	226.2	.99992		1 06 00.28
.0193	.01930		.99981		.28553	225.0	.99992		1 06 20.91
.0194	.01940		.99981		.28777	223.8	.99992		1 06 41.54
0.0195	0.01950	10.0	0.99981	0.2	8.29001	222.7	9.99992	0.1	1 07 02.16
.0196	.01960		.99981		.29223	221.6	.99992		1 07 22.79
.0197	.01970		.99981		.29444	220.4	.99992		1 07 43.42
.0198	.01980		.99980		.29664	219.3	.99991		1 08 04.04
.0199	.01990		.99980		.29882	218.2	.99991		1 08 24.67
0.0200	0.02000	10.0	0.99980	0.2	8.30100	217.1	9.99991	0.1	1 08 45.30
$u$	$-\tanh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{1}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$\alpha$	$\sin \alpha$	$\omega F_0'$	$\cos \alpha$	$\omega F_0'$	$\log \sin \alpha$	$\omega F_0'$	$\log \cos \alpha$	$\omega F_0'$	$u$
0.0200	0.02000	10.0	0.99980	0.2	8.30100	217.1	9.99991	0.1	1 08 45.30
.0201	.02010		.99980		.30317	216.0	.99991		1 09 05.92
.0202	.02020		.99980		.30534	215.0	.99991		1 09 26.55
.0203	.02030		.99979		.30747	214.0	.99991		1 09 47.18
.0204	.02040		.99979		.30960	213.0	.99991		1 10 07.80
0.0205	0.02050	10.0	0.99979	0.2	8.31172	211.8	9.99891	0.1	1 10 28.43
.0206	.02060		.99979		.31384	210.8	.99991		1 10 49.06
.0207	.02070		.99979		.31594	209.8	.99991		1 11 09.68
.0208	.02080		.99978		.31804	208.8	.99991		1 11 30.31
.0209	.02090		.99978		.32012	207.8	.99991		1 11 50.93
0.0210	0.02100	10.0	0.99978	0.2	8.32219	206.8	9.99800	0.1	1 12 11.56
.0211	.02110		.99978		.32425	205.8	.99990		1 12 32.19
.0212	.02120		.99978		.32630	204.8	.99990		1 12 52.81
.0213	.02130		.99977		.32835	203.9	.99990		1 13 13.44
.0214	.02140		.99977		.33038	203.0	.99990		1 13 34.07
0.0215	0.02150	10.0	0.99977	0.2	8.33441	202.0	9.99800	0.1	1 13 54.69
.0216	.02160		.99977		.33442	201.0	.99990		1 14 15.32
.0217	.02170		.99976		.33643	200.1	.99990		1 14 35.95
.0218	.02180		.99976		.33842	199.2	.99990		1 14 56.57
.0219	.02190		.99976		.34041	198.3	.99990		1 15 17.20
0.0220	0.02200	10.0	0.99976	0.2	8.34330	197.4	9.99889	0.1	1 15 37.83
.0221	.02210		.99976		.34430	196.5	.99989		1 15 58.45
.0222	.02220		.99975		.34632	195.6	.99989		1 16 19.08
.0223	.02230		.99975		.34837	194.7	.99989		1 16 39.71
.0224	.02240		.99975		.35031	193.8	.99989		1 17 00.33
0.0225	0.02250	10.0	0.99975	0.2	8.35215	193.0	9.99889	0.1	1 17 20.96
.0226	.02260		.99974		.35407	192.1	.99989		1 17 41.58
.0227	.02270		.99974		.35600	191.3	.99989		1 18 02.21
.0228	.02280		.99974		.35793	190.4	.99989		1 18 22.81
.0229	.02290		.99974		.35983	189.6	.99989		1 18 43.46
0.0230	0.02300	10.0	0.99974	0.2	8.36160	188.8	9.99888	0.1	1 19 04.09
.0231	.02310		.99973		.36357	188.0	.99988		1 19 24.72
.0232	.02320		.99973		.36545	187.2	.99988		1 19 45.34
.0233	.02330		.99973		.36734	186.4	.99988		1 20 05.97
.0234	.02340		.99973		.36918	185.6	.99988		1 20 26.60
0.0235	0.02350	10.0	0.99972	0.2	8.37103	184.8	9.99888	0.1	1 20 47.22
.0236	.02360		.99972		.37287	184.0	.99988		1 21 07.85
.0237	.02370		.99972		.37471	183.2	.99988		1 21 28.48
.0238	.02380		.99972		.37651	182.4	.99988		1 21 49.10
.0239	.02390		.99971		.37836	181.7	.99988		1 22 09.73
0.0240	0.02400	10.0	0.99971	0.2	8.38017	180.9	9.99887	0.1	1 22 30.36
.0241	.02410		.99971		.38168	180.2	.99987		1 22 50.98
.0242	.02420		.99971		.38377	179.4	.99987		1 23 11.61
.0243	.02430		.99970		.38555	178.7	.99987		1 23 32.23
.0244	.02440		.99970		.38735	178.0	.99987		1 23 52.86
0.0245	0.02450	10.0	0.99970	0.2	8.38912	177.2	9.99887	0.1	1 24 13.49
.0246	.02460		.99970		.39089	176.5	.99987		1 24 34.11
.0247	.02470		.99969		.39265	175.8	.99987		1 24 54.74
.0248	.02480		.99969		.39441	175.1	.99987		1 25 15.37
.0249	.02490		.99969		.39615	174.4	.99987		1 25 35.99
0.0250	0.02500	10.0	0.99969	0.2	8.39789	173.7	9.99885	0.1	1 25 56.62
$\Pi$	$-1 \sinh \Pi$	$\omega F_0'$	$\cosh \Pi$	$\omega F_0'$	$\log \sinh \Pi$	$\omega F_0'$	$\log \cosh \Pi$	$\omega F_0'$	$\Pi$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0450	0.04500	10.0	0.99969	0.2	8.39789	173.7	9.99986	0.1	0° 56' 62
0.0451	0.04510		0.99969	0.3	8.39803	173.0	9.99986		1 25 17.25
0.0452	0.04520		0.99968		8.39815	172.3	9.99986		1 26 37.87
0.0453	0.04530		0.99968		8.39827	171.6	9.99985		1 26 58.50
0.0454	0.04540		0.99968		8.39839	170.9	9.99986		1 27 19.13
0.0455	0.04550	10.0	0.99967	0.3	8.39849	170.3	9.99986	0.1	1 27 39.75
0.0456	0.04560		0.99967		8.39861	169.6	9.99985		1 28 00.38
0.0457	0.04570		0.99967		8.39873	168.9	9.99985		1 28 21.01
0.0458	0.04580		0.99967		8.39885	168.3	9.99986		1 28 41.63
0.0459	0.04590		0.99966		8.39897	167.6	9.99985		1 29 02.26
0.0460	0.04600	10.0	0.99966	0.3	8.39909	167.0	9.99985	0.1	1 29 22.88
0.0461	0.04610		0.99966		8.39921	166.3	9.99985		1 29 43.51
0.0462	0.04620		0.99965		8.39933	165.7	9.99985		1 30 04.14
0.0463	0.04630		0.99965		8.39945	165.1	9.99985		1 30 24.76
0.0464	0.04640		0.99965		8.39957	164.5	9.99985		1 30 45.39
0.0465	0.04650	10.0	0.99965	0.3	8.39969	163.8	9.99985	0.1	1 31 06.02
0.0466	0.04660		0.99965		8.39981	163.2	9.99985		1 31 26.64
0.0467	0.04670		0.99964		8.39993	162.6	9.99985		1 31 47.27
0.0468	0.04680		0.99964		8.40005	162.0	9.99984		1 32 07.90
0.0469	0.04690		0.99964		8.40017	161.4	9.99984		1 32 28.52
0.0470	0.04700	10.0	0.99964	0.3	8.40029	160.8	9.99984	0.1	1 32 49.15
0.0471	0.04710		0.99963		8.40041	160.2	9.99984		1 33 09.78
0.0472	0.04720		0.99963		8.40053	159.6	9.99984		1 33 30.40
0.0473	0.04730		0.99963		8.40065	159.0	9.99984		1 33 51.03
0.0474	0.04740		0.99962		8.40077	158.5	9.99984		1 34 11.66
0.0475	0.04750	10.0	0.99962	0.3	8.40089	157.9	9.99984	0.1	1 34 32.28
0.0476	0.04760		0.99962		8.40101	157.3	9.99983		1 34 52.91
0.0477	0.04770		0.99962		8.40113	156.7	9.99983		1 35 13.54
0.0478	0.04780		0.99961		8.40125	156.2	9.99983		1 35 34.16
0.0479	0.04790		0.99961		8.40137	155.6	9.99983		1 35 54.79
0.0480	0.04800	10.0	0.99961	0.3	8.40149	155.1	9.99983	0.1	1 36 15.41
0.0481	0.04810		0.99961		8.40161	154.5	9.99983		1 36 36.04
0.0482	0.04820		0.99960		8.40173	154.0	9.99983		1 36 56.67
0.0483	0.04830		0.99960		8.40185	153.4	9.99983		1 37 17.29
0.0484	0.04840		0.99960		8.40197	152.9	9.99982		1 37 37.92
0.0485	0.04850	10.0	0.99959	0.3	8.40209	152.3	9.99982	0.1	1 37 58.55
0.0486	0.04860		0.99959		8.40221	151.8	9.99982		1 38 19.17
0.0487	0.04870		0.99959		8.40233	151.3	9.99982		1 38 39.80
0.0488	0.04880		0.99959		8.40245	150.8	9.99982		1 39 00.43
0.0489	0.04890		0.99958		8.40257	150.2	9.99982		1 39 21.05
0.0490	0.04900	10.0	0.99958	0.3	8.40269	149.7	9.99982	0.1	1 39 41.68
0.0491	0.04910		0.99958		8.40281	149.2	9.99982		1 40 02.31
0.0492	0.04920		0.99957		8.40293	148.7	9.99981		1 40 22.93
0.0493	0.04930		0.99957		8.40305	148.2	9.99981		1 40 43.56
0.0494	0.04940		0.99957		8.40317	147.7	9.99981		1 41 04.19
0.0495	0.04950	10.0	0.99956	0.3	8.40329	147.2	9.99981	0.1	1 41 24.81
0.0496	0.04960		0.99956		8.40341	146.7	9.99981		1 41 45.44
0.0497	0.04970		0.99956		8.40353	146.2	9.99981		1 42 06.06
0.0498	0.04980		0.99956		8.40365	145.7	9.99981		1 42 26.69
0.0499	0.04990		0.99955		8.40377	145.2	9.99981		1 42 47.32
0.0500	0.05000	10.0	0.99955	0.3	8.40389	144.7	9.99980	0.1	1 43 07.94
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0300	0.03000	10,0	0.99955	0,3	8.47706	141,7	9.99980	0,1	I 43 07.94
.0301	.03010		.99955		.47850	141,2	.99980		I 43 28.57
.0302	.03020		.99954		.47994	143,8	.99980		I 43 49.20
.0303	.03030		.99954		.48138	143,3	.99980		I 44 09.82
.0304	.03040		.99954		.48281	142,8	.99980		I 44 30.45
0.0305	0.03050	10,0	0.99953	0,3	8.48423	142,3	9.99980	0,1	I 44 51.08
.0306	.03060		.99953		.48565	141,9	.99980		I 45 11.70
.0307	.03070		.99953		.48707	141,4	.99980		I 45 32.33
.0308	.03080		.99953		.48848	141,0	.99979		I 45 52.96
.0309	.03090		.99952		.48989	140,5	.99979		I 46 13.58
0.0310	0.03100	10,0	0.99952	0,3	8.49129	140,1	9.99979	0,1	I 46 34.21
.0311	.03109		.99952		.49269	139,6	.99979		I 46 54.84
.0312	.03119		.99951		.49408	139,2	.99979		I 47 15.46
.0313	.03129		.99951		.49547	138,7	.99979		I 47 36.09
.0314	.03139		.99951		.49685	138,3	.99979		I 47 56.71
0.0315	0.03149	10,0	0.99950	0,3	8.49824	137,8	9.99978	0,1	I 48 17.34
.0316	.03159		.99950		.49961	137,4	.99978		I 48 37.97
.0317	.03169		.99950		.50099	137,0	.99978		I 48 58.59
.0318	.03179		.99949		.50235	136,5	.99978		I 49 19.22
.0319	.03189		.99949		.50372	136,1	.99978		I 49 39.85
0.0320	0.03199	10,0	0.99949	0,3	8.50503	135,7	9.99978	0,1	I 50 00.47
.0321	.03209		.99948		.50543	135,2	.99978		I 50 21.10
.0322	.03219		.99948		.50778	134,8	.99977		I 50 41.73
.0323	.03229		.99948		.50913	134,4	.99977		I 51 02.35
.0324	.03239		.99948		.51047	134,0	.99977		I 51 22.98
0.0325	0.03249	10,0	0.99947	0,3	8.51181	133,6	9.99977	0,1	I 51 43.61
.0326	.03259		.99947		.51314	133,2	.99977		I 52 04.23
.0327	.03269		.99947		.51447	132,8	.99977		I 52 24.86
.0328	.03279		.99946		.51580	132,4	.99977		I 52 45.49
.0329	.03289		.99946		.51712	132,0	.99976		I 53 06.11
0.0330	0.03299	10,0	0.99946	0,3	8.51844	131,6	9.99976	0,1	I 53 26.74
.0331	.03309		.99945		.51975	131,2	.99976		I 53 47.37
.0332	.03319		.99945		.52106	130,8	.99976		I 54 07.99
.0333	.03329		.99945		.52236	130,4	.99976		I 54 28.62
.0334	.03339		.99944		.52367	130,0	.99976		I 54 49.24
0.0335	0.03349	10,0	0.99944	0,3	8.52496	129,6	9.99976	0,1	I 55 09.87
.0336	.03359		.99944		.52526	129,2	.99975		I 55 30.50
.0337	.03369		.99943		.52755	128,8	.99975		I 55 51.12
.0338	.03379		.99943		.52883	128,4	.99975		I 56 11.75
.0339	.03389		.99943		.53012	128,1	.99975		I 56 32.38
0.0340	0.03399	10,0	0.99942	0,3	8.53140	127,7	9.99975	0,1	I 56 53.00
.0341	.03409		.99942		.53267	127,3	.99975		I 57 13.63
.0342	.03419		.99942		.53394	126,9	.99975		I 57 34.26
.0343	.03429		.99941		.53521	126,6	.99974		I 57 54.88
.0344	.03439		.99941		.53647	126,2	.99974		I 58 15.51
0.0345	0.03449	10,0	0.99940	0,3	8.53773	125,8	9.99974	0,1	I 58 36.14
.0346	.03459		.99940		.53899	125,5	.99974	0,2	I 58 56.76
.0347	.03469		.99940		.54024	125,1	.99974		I 59 17.39
.0348	.03479		.99939		.54149	124,7	.99974		I 59 38.02
.0349	.03489		.99939		.54274	124,4	.99974		I 59 58.64
0.0350	0.03499	10,0	0.99939	0,3	8.54398	124,0	9.99973	0,2	2 00 19.27
$u$	$-\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$\angle$
0.0350	0.03499	10.00	0.99939	0.3	8.54398	12.40	9.99973	0.2	2 00 19.27
.0351	.03500		.99938	0.1	.54522	12.37	.99973		2 00 39.89
.0352	.03510		.99937		.54645	12.33	.99973		2 01 00.52
.0353	.03520		.99936		.54768	12.30	.99973		2 01 21.15
.0354	.03530		.99935		.54891	12.26	.99973		2 01 41.77
0.0355	0.03549	0.0	0.99934	0.4	8.55014	122.3	9.99973	0.2	2 02 02.40
.0356	.03550		.99933		.55136	121.9	.99972		2 02 23.03
.0357	.03560		.99932		.55258	121.6	.99972		2 02 43.65
.0358	.03570		.99931		.55379	121.3	.99972		2 03 04.28
.0359	.03580		.99930		.55500	120.9	.99972		2 03 24.91
0.0360	0.03599	10.0	0.999335	0.1	8.55621	120.6	9.99972	0.2	2 03 45.53
.0361	.03600		.99935		.55741	120.3	.99972		2 04 06.16
.0362	.03610		.99934		.55861	119.9	.99972		2 04 26.79
.0363	.03620		.99934		.55981	119.6	.99971		2 04 47.41
.0364	.03630		.99934		.56101	119.3	.99971		2 05 08.04
0.0365	0.03649	10.0	0.99933	0.4	8.56220	118.9	9.99971	0.2	2 05 28.67
.0366	.03650		.99933		.56341	118.6	.99971		2 05 49.29
.0367	.03660		.99932		.56457	118.3	.99971		2 06 09.92
.0368	.03670		.99932		.56575	118.0	.99971		2 06 30.54
.0369	.03680		.99932		.56693	117.6	.99970		2 06 51.17
0.0370	0.03699	10.0	0.99932	0.4	8.56810	117.3	9.99970	0.2	2 07 11.80
.0371	.03700		.99931		.56927	117.0	.99970		2 07 32.42
.0372	.03710		.99931		.57044	116.7	.99970		2 07 53.05
.0373	.03720		.99930		.57161	116.4	.99970		2 08 13.68
.0374	.03730		.99930		.57277	116.1	.99970		2 08 34.30
0.0375	0.03749	10.0	0.99930	0.4	8.57393	115.8	9.99969	0.2	2 08 54.93
.0376	.03750		.99930		.57509	115.4	.99969		2 09 15.56
.0377	.03760		.99929		.57624	115.1	.99969		2 09 36.18
.0378	.03770		.99929		.57739	114.8	.99969		2 09 56.81
.0379	.03780		.99928		.57854	114.5	.99969		2 10 17.44
0.0380	0.03799	10.0	0.99928	0.4	8.57968	114.2	9.99969	0.2	2 10 38.06
.0381	.03800		.99927		.58082	113.9	.99968		2 10 58.69
.0382	.03810		.99927		.58196	113.6	.99968		2 11 19.32
.0383	.03820		.99927		.58310	113.3	.99968		2 11 39.94
.0384	.03830		.99926		.58422	113.0	.99968		2 12 00.57
0.0385	0.03849	10.0	0.99926	0.4	8.58535	112.7	9.99968	0.2	2 12 21.20
.0386	.03850		.99925		.58648	112.5	.99968		2 12 41.82
.0387	.03860		.99925		.58760	112.2	.99967		2 13 02.45
.0388	.03870		.99925		.58872	111.9	.99967		2 13 23.07
.0389	.03880		.99924		.58984	111.6	.99967		2 13 43.70
0.0390	0.03899	10.0	0.99924	0.4	8.59095	111.3	9.99967	0.2	2 14 04.33
.0391	.03900		.99924		.59207	111.0	.99967		2 14 24.95
.0392	.03910		.99923		.59317	110.7	.99967		2 14 45.58
.0393	.03920		.99923		.59428	110.5	.99966		2 15 06.21
.0394	.03930		.99922		.59538	110.2	.99966		2 15 26.83
0.0395	0.03949	10.0	0.99922	0.4	8.59648	109.9	9.99966	0.2	2 15 47.46
.0396	.03950		.99922		.59758	109.6	.99966		2 16 08.09
.0397	.03960		.99921		.59868	109.3	.99966		2 16 28.71
.0398	.03970		.99921		.59977	109.1	.99966		2 16 49.34
.0399	.03980		.99920		.60085	108.8	.99965		2 17 09.97
0.0400	0.03999	10.0	0.99920	0.4	8.60194	108.5	9.99965	0.2	2 17 30.59
$u$	$-\frac{1}{2} \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$d$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0100	0.03099	10.0	0.99920	0.4	8.60104	108.5	0.00005	0.2	2 17 30.59
0.0101	0.03099		0.99920		0.0303	108.5	0.00005		2 17 51.22
0.0102	0.03100		0.99919		0.0311	108.0	0.00005		2 18 11.85
0.0103	0.03100		0.99919		0.0319	107.7	0.00005		2 18 32.47
0.0104	0.03100		0.99918		0.0326	107.4	0.00005		2 18 53.10
0.0105	0.03100	10.0	0.99918	0.4	8.60734	107.3	0.00004	0.2	2 19 13.72
0.0106	0.03100		0.99918		0.0331	106.9	0.00004		2 19 34.35
0.0107	0.03100		0.99917		0.0347	106.6	0.00004		2 19 54.98
0.0108	0.03100		0.99917		0.0354	106.4	0.00004		2 20 15.60
0.0109	0.03100		0.99916		0.0360	106.1	0.00004		2 20 36.23
0.0110	0.03100	10.0	0.99916	0.4	8.61360	105.9	0.00003	0.2	2 20 56.86
0.0111	0.03100		0.99916		0.0372	105.6	0.00003		2 21 17.48
0.0112	0.03110		0.99915		0.0377	105.4	0.00003		2 21 38.11
0.0113	0.03120		0.99915		0.0383	105.1	0.00003		2 21 58.74
0.0114	0.03130		0.99914		0.0388	104.8	0.00003		2 22 19.36
0.0115	0.03140	10.0	0.99914	0.4	8.61702	104.6	0.00003	0.2	2 22 39.99
0.0116	0.03150		0.99913		0.0397	104.3	0.00002		2 23 00.62
0.0117	0.03160		0.99913		0.0401	104.1	0.00002		2 23 21.24
0.0118	0.03170		0.99913		0.0405	103.8	0.00002		2 23 41.87
0.0119	0.03180		0.99912		0.0409	103.6	0.00002		2 24 02.50
0.0120	0.03190	10.0	0.99912	0.4	8.62313	103.3	0.00002	0.2	2 24 23.12
0.0121	0.03200		0.99911		0.0415	103.1	0.00002		2 24 43.75
0.0122	0.03210		0.99911		0.0418	102.9	0.00001		2 25 04.37
0.0123	0.03220		0.99911		0.0421	102.7	0.00001		2 25 25.00
0.0124	0.03230		0.99910		0.0424	102.4	0.00001		2 25 45.63
0.0125	0.03240	10.0	0.99910	0.4	8.62836	102.1	0.00000	0.2	2 26 06.25
0.0126	0.03250		0.99909		0.0428	101.9	0.00000		2 26 26.88
0.0127	0.03260		0.99909		0.0430	101.6	0.00000		2 26 47.51
0.0128	0.03270		0.99908		0.0431	101.4	0.00000		2 27 08.13
0.0129	0.03280		0.99908		0.0432	101.2	0.00000		2 27 28.76
0.0130	0.03290	10.0	0.99908	0.4	8.63333	100.9	0.00000	0.2	2 27 49.39
0.0131	0.03300		0.99907		0.0434	100.7	0.00000		2 28 10.01
0.0132	0.03310		0.99907		0.0435	100.5	0.00000		2 28 30.64
0.0133	0.03320		0.99906		0.0436	100.3	0.00000		2 28 51.27
0.0134	0.03330		0.99906		0.0437	100.0	0.00000		2 29 11.89
0.0135	0.03340	10.0	0.99905	0.4	8.63835	99.8	0.00000	0.2	2 29 32.52
0.0136	0.03350		0.99905		0.0438	99.5	0.00000		2 29 53.15
0.0137	0.03360		0.99905		0.0439	99.3	0.00000		2 30 13.77
0.0138	0.03370		0.99904		0.0440	99.1	0.00000		2 30 34.40
0.0139	0.03380		0.99904		0.0441	98.9	0.00000		2 30 55.02
0.0140	0.03390	10.0	0.99903	0.4	8.64331	98.6	0.00000	0.2	2 31 15.65
0.0141	0.03400		0.99903		0.0442	98.4	0.00000		2 31 36.28
0.0142	0.03410		0.99902		0.0443	98.2	0.00000		2 31 56.90
0.0143	0.03420		0.99902		0.0444	98.0	0.00000		2 32 17.53
0.0144	0.03430		0.99901		0.0445	97.7	0.00000		2 32 38.16
0.0145	0.03440	10.0	0.99901	0.4	8.64822	97.5	0.00000	0.2	2 32 58.78
0.0146	0.03450		0.99901		0.0446	97.3	0.00000		2 33 19.41
0.0147	0.03460		0.99900		0.0447	97.1	0.00000		2 33 40.04
0.0148	0.03470		0.99900		0.0448	96.9	0.00000		2 34 00.66
0.0149	0.03480		0.99899		0.0449	96.7	0.00000		2 34 21.29
0.0150	0.03490	10.0	0.99899	0.4	8.65307	96.4	0.00000	0.2	2 34 41.92
$u$	$-1 \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0450	0.04488	10.0	0.99899	0.4	8.65307	95.4	9.99956	0.2	2 34 41.92
0.0451	0.04508		0.99898	0.5	8.65403	95.2	9.99956		2 35 02.54
0.0452	0.04528		0.99898		8.65499	95.0	9.99956		2 35 23.17
0.0453	0.04548		0.99897		8.65595	95.8	9.99955		2 35 43.80
0.0454	0.04568		0.99897		8.65691	95.6	9.99955		2 36 04.42
0.0455	0.04588	10.0	0.99897	0.5	8.65786	95.4	9.99955	0.2	2 36 25.05
0.0456	0.04598		0.99896		8.65881	95.2	9.99955		2 36 45.68
0.0457	0.04608		0.99896		8.65976	95.0	9.99955		2 37 06.30
0.0458	0.04628		0.99895		8.66071	94.8	9.99954		2 37 26.93
0.0459	0.04648		0.99895		8.66166	94.6	9.99954		2 37 47.55
0.0460	0.04668	10.0	0.99894	0.5	8.66260	94.3	9.99954	0.2	2 38 08.18
0.0461	0.04688		0.99894		8.66355	94.1	9.99954		2 38 28.81
0.0462	0.04708		0.99893		8.66449	93.9	9.99954		2 38 49.43
0.0463	0.04728		0.99893		8.66543	93.7	9.99953		2 39 10.06
0.0464	0.04748		0.99892		8.66636	93.5	9.99953		2 39 30.69
0.0465	0.04768	10.0	0.99892	0.5	8.66730	93.3	9.99953	0.2	2 39 51.31
0.0466	0.04788		0.99891		8.66823	93.1	9.99953		2 40 11.94
0.0467	0.04808		0.99891		8.66916	92.9	9.99953		2 40 32.57
0.0468	0.04828		0.99890		8.67009	92.7	9.99952		2 40 53.19
0.0469	0.04848		0.99890		8.67101	92.5	9.99952		2 41 13.82
0.0470	0.04868	10.0	0.99890	0.5	8.67194	92.3	9.99952	0.2	2 41 34.45
0.0471	0.04888		0.99889		8.67286	92.1	9.99952		2 41 55.07
0.0472	0.04908		0.99889		8.67378	91.9	9.99952		2 42 15.70
0.0473	0.04928		0.99888		8.67470	91.7	9.99951		2 42 36.33
0.0474	0.04948		0.99888		8.67562	91.6	9.99951		2 42 56.95
0.0475	0.04968	10.0	0.99887	0.5	8.67653	91.4	9.99951	0.2	2 43 17.58
0.0476	0.04988		0.99887		8.67744	91.2	9.99951		2 43 38.20
0.0477	0.05008		0.99886		8.67835	91.0	9.99951		2 43 58.83
0.0478	0.05028		0.99886		8.67926	90.8	9.99950		2 44 19.46
0.0479	0.05048		0.99885		8.68017	90.6	9.99950		2 44 40.08
0.0480	0.05068	10.0	0.99885	0.5	8.68107	90.4	9.99950	0.2	2 45 00.71
0.0481	0.05088		0.99884		8.68198	90.2	9.99950		2 45 21.34
0.0482	0.05108		0.99884		8.68288	90.0	9.99950		2 45 41.96
0.0483	0.05128		0.99883		8.68378	89.8	9.99949		2 46 02.59
0.0484	0.05148		0.99883		8.68468	89.7	9.99949		2 46 23.22
0.0485	0.05168	10.0	0.99882	0.5	8.68557	89.5	9.99949	0.2	2 46 43.84
0.0486	0.05188		0.99882		8.68647	89.3	9.99949		2 47 04.47
0.0487	0.05208		0.99881		8.68736	89.1	9.99948		2 47 25.10
0.0488	0.05228		0.99881		8.68825	88.9	9.99948		2 47 45.72
0.0489	0.05248		0.99880		8.68914	88.7	9.99948		2 48 06.35
0.0490	0.05268	10.0	0.99880	0.5	8.69002	88.6	9.99948	0.2	2 48 26.98
0.0491	0.05288		0.99879		8.69091	88.4	9.99948		2 48 47.60
0.0492	0.05308		0.99879		8.69179	88.2	9.99947		2 49 08.23
0.0493	0.05328		0.99879		8.69267	88.0	9.99947		2 49 28.85
0.0494	0.05348		0.99878		8.69355	87.8	9.99947		2 49 49.48
0.0495	0.05368	10.0	0.99878	0.5	8.69443	87.7	9.99947	0.2	2 50 10.11
0.0496	0.05388		0.99877		8.69530	87.5	9.99947		2 50 30.73
0.0497	0.05408		0.99877		8.69618	87.3	9.99946		2 50 51.36
0.0498	0.05428		0.99876		8.69705	87.1	9.99946		2 51 11.99
0.0499	0.05448		0.99876		8.69792	87.0	9.99946		2 51 32.61
0.0500	0.05468	10.0	0.99875	0.5	8.69879	86.8	9.99946	0.2	2 51 53.24
$u$	$-1 \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$



## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0500	0.04998	10.0	0.99875	0.5	8.69879	85.8	0.00010	0.2	" " "
.0501	.05008		.99875		.69990	85.6	.00015		2 51 53.24
.0502	.05018		.99874		.70052	85.4	.00015		2 52 13.87
.0503	.05028		.99871		.70133	85.3	.00015		2 52 34.40
.0504	.05038		.99873		.70225	85.1	.00015		2 52 55.02
									2 53 15.75
0.0505	0.05048	10.0	0.99873	0.5	8.70311	85.0	0.00015	0.2	2 53 36.37
.0506	.05058		.99872		.70397	85.8	.00014		2 53 57.00
.0507	.05068		.99872		.70483	85.6	.00014		2 54 17.63
.0508	.05078		.99871		.70568	85.4	.00014		2 54 38.25
.0509	.05088		.99870		.70653	85.2	.00014		2 54 58.88
0.0510	0.05098	10.0	0.99870	0.5	8.70738	85.1	0.00013	0.2	2 55 19.51
.0511	.05108		.99870		.70823	84.9	.00013		2 55 40.13
.0512	.05118		.99870		.70908	84.7	.00013		2 56 00.76
.0513	.05128		.99868		.70993	84.6	.00013		2 56 21.38
.0514	.05138		.99868		.71077	84.4	.00013		2 56 42.01
0.0515	0.05148	10.0	0.99867	0.5	8.71162	84.3	0.00013	0.2	2 57 02.64
.0516	.05158		.99867		.71246	84.1	.00013		2 57 23.26
.0517	.05168		.99866		.71330	84.0	.00013		2 57 43.89
.0518	.05178		.99866		.71414	83.8	.00013		2 58 04.52
.0519	.05188		.99865		.71497	83.6	.00013		2 58 25.14
0.0520	0.05198	10.0	0.99865	0.5	8.71581	83.4	0.00011	0.2	2 58 45.77
.0521	.05208		.99864		.71664	83.3	.00011		2 59 06.40
.0522	.05218		.99864		.71747	83.1	.00011		2 59 27.02
.0523	.05228		.99863		.71830	83.0	.00011		2 59 47.65
.0524	.05238		.99863		.71913	82.8	.00010		3 00 08.28
0.0525	0.05248	10.0	0.99862	0.5	8.71999	82.6	0.00010	0.2	3 00 28.90
.0526	.05258		.99862		.72079	82.5	.00010		3 00 49.53
.0527	.05268		.99861		.72161	82.4	.00010		3 01 10.16
.0528	.05278		.99861		.72243	82.2	.00010		3 01 30.78
.0529	.05288		.99860		.72325	82.0	.00010		3 01 51.41
0.0530	0.05298	10.0	0.99860	0.5	8.72407	81.9	0.00010	0.2	3 02 12.03
.0531	.05308		.99859		.72488	81.7	.00010		3 02 32.66
.0532	.05317		.99859		.72571	81.6	.00010		3 02 53.29
.0533	.05327		.99858		.72653	81.4	.00010		3 03 13.91
.0534	.05337		.99857		.72733	81.3	.00010		3 03 34.54
0.0535	0.05347	10.0	0.99857	0.5	8.72815	81.1	0.00010	0.2	3 03 55.17
.0536	.05357		.99856		.72896	80.9	.00010		3 04 15.79
.0537	.05367		.99856		.72977	80.8	.00010		3 04 36.42
.0538	.05377		.99855		.73057	80.6	.00010		3 04 57.05
.0539	.05387		.99855		.73138	80.5	.00010		3 05 17.67
0.0540	0.05397	10.0	0.99854	0.5	8.73248	80.3	0.00010	0.2	3 05 38.30
.0541	.05407		.99854		.73329	80.2	.00010		3 05 58.93
.0542	.05417		.99853		.73370	80.0	.00010		3 06 19.55
.0543	.05427		.99853		.73450	79.9	.00010		3 06 40.18
.0544	.05437		.99852		.73538	79.8	.00010		3 07 00.81
0.0545	0.05447	10.0	0.99852	0.5	8.73618	79.6	0.00010	0.2	3 07 21.43
.0546	.05457		.99851		.73698	79.5	.00010		3 07 42.06
.0547	.05467		.99850		.73777	79.3	.00010		3 08 02.68
.0548	.05477		.99850		.73856	79.2	.00010		3 08 23.31
.0549	.05487		.99849		.73935	79.0	.00010		3 08 43.94
0.0550	0.05497	10.0	0.99849	0.5	8.74014	78.9	0.00010	0.2	3 09 04.56
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

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## Circular Functions.

$u$	$\sin u$	$\omega F_u'$	$\cos u$	$\omega F_u'$	$\log \sin u$	$\omega F_u'$	$\log \cos u$	$\omega F_u'$	$u$
0.0550	0.05497	10.0	0.99840	0.5	8.74014	78.9	9.99934	0.2	3 09 04.56
.0551	.05507		.99838	0.6	.74093	78.7	.99934		3 09 25.19
.0552	.05517		.99838		.74172	78.6	.99934		3 09 45.82
.0553	.05527		.99837		.74250	78.5	.99934		3 10 05.44
.0554	.05537		.99837		.74329	78.3	.99933		3 10 27.07
0.0555	0.05547	10.0	0.99836	0.6	8.74407	78.2	9.99933	0.2	3 10 47.70
.0556	.05557		.99835		.74485	78.0	.99933		3 11 08.32
.0557	.05567		.99835		.74563	77.9	.99933		3 11 28.95
.0558	.05577		.99834		.74641	77.7	.99932		3 11 49.58
.0559	.05587		.99834		.74719	77.6	.99932		3 12 10.20
0.0560	0.05597	10.0	0.99833	0.6	8.74796	77.5	9.99932	0.2	3 12 30.83
.0561	.05607		.99833		.74873	77.3	.99932		3 12 51.46
.0562	.05617		.99832		.74951	77.2	.99931		3 13 12.08
.0563	.05627		.99832		.75028	77.1	.99931		3 13 32.71
.0564	.05637		.99831		.75105	76.9	.99931		3 13 53.34
0.0565	0.05647	10.0	0.99830	0.6	8.75182	76.8	9.99931	0.2	3 14 13.96
.0566	.05657		.99830		.75258	76.6	.99930		3 14 34.59
.0567	.05667		.99830		.75335	76.5	.99930		3 14 55.21
.0568	.05677		.99830		.75411	76.4	.99930		3 15 15.84
.0569	.05687		.99838		.75488	76.2	.99930		3 15 36.47
0.0570	0.05697	10.0	0.99838	0.6	8.75564	76.1	9.99929	0.2	3 15 57.09
.0571	.05707		.99837		.75640	76.0	.99929		3 16 17.72
.0572	.05717		.99836		.75716	75.8	.99929		3 16 38.35
.0573	.05727		.99836		.75792	75.7	.99929		3 16 58.97
.0574	.05737		.99835		.75867	75.6	.99928		3 17 19.60
0.0575	0.05747	10.0	0.99835	0.6	8.75943	75.4	9.99928	0.2	3 17 40.23
.0576	.05757		.99834		.76018	75.3	.99928	0.3	3 18 00.85
.0577	.05767		.99834		.76093	75.2	.99928		3 18 21.48
.0578	.05777		.99833		.76169	75.1	.99927		3 18 42.11
.0579	.05787		.99833		.76244	74.9	.99927		3 19 02.73
0.0580	0.05797	10.0	0.99832	0.6	8.76318	74.8	9.99927	0.3	3 19 23.36
.0581	.05807		.99831		.76393	74.7	.99927		3 19 43.99
.0582	.05817		.99831		.76468	74.5	.99926		3 20 04.61
.0583	.05827		.99830		.76542	74.4	.99926		3 20 25.24
.0584	.05837		.99830		.76617	74.3	.99926		3 20 45.86
0.0585	0.05847	10.0	0.99830	0.6	8.76691	74.2	9.99926	0.3	3 21 06.49
.0586	.05857		.99828		.76765	74.0	.99925		3 21 27.12
.0587	.05867		.99828		.76839	73.9	.99925		3 21 47.74
.0588	.05877		.99827		.76913	73.8	.99925		3 22 08.37
.0589	.05887		.99827		.76986	73.6	.99925		3 22 29.00
0.0590	0.05897	10.0	0.99826	0.6	8.77060	73.5	9.99924	0.3	3 22 49.62
.0591	.05907		.99825		.77133	73.4	.99924		3 23 10.25
.0592	.05917		.99825		.77207	73.3	.99924		3 23 30.88
.0593	.05927		.99824		.77280	73.2	.99924		3 23 51.50
.0594	.05937		.99824		.77353	73.0	.99923		3 24 12.13
0.0595	0.05946	10.0	0.99823	0.6	8.77426	72.9	9.99923	0.3	3 24 32.76
.0596	.05956		.99822		.77499	72.8	.99923		3 24 53.38
.0597	.05966		.99822		.77572	72.7	.99923		3 25 14.01
.0598	.05976		.99821		.77644	72.5	.99922		3 25 34.64
.0599	.05986		.99821		.77717	72.4	.99922		3 25 55.26
0.0600	0.05996	10.0	0.99820	0.6	8.77789	72.3	9.99922	0.3	3 26 15.89
$u$	$-\log \sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\log \frac{\sinh u}{u}$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$u$

Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0010	0.059955	10.0	0.99820	0.6	8.77789	72.3	0.00022	0.3	3 30 15.89
0.0011	0.060051		0.99819		778.01	72.3	0.00022		3 30 36.51
0.0012	0.060146		0.99819		779.33	72.3	0.00022		3 30 57.14
0.0013	0.060243		0.99818		780.65	71.9	0.00021		3 32 17.77
0.0014	0.060336		0.99818		780.97	71.8	0.00021		3 32 38.39
0.0015	0.060416	10.0	0.99817	0.6	8.78149	71.7	0.00020	0.3	3 32 59.02
0.0016	0.060506		0.99816		782.21	71.6	0.00020		3 33 19.65
0.0017	0.060596		0.99816		783.52	71.5	0.00020		3 33 40.27
0.0018	0.060676		0.99815		784.84	71.3	0.00020		3 30 00.90
0.0019	0.060755		0.99815		785.15	71.2	0.00019		3 30 21.53
0.0020	0.060836	10.0	0.99814	0.6	8.78509	71.1	0.00019	0.3	3 30 42.15
0.0021	0.060916		0.99813		785.77	71.0	0.00019		3 30 62.78
0.0022	0.061006		0.99813		786.08	70.9	0.00019		3 30 83.41
0.0023	0.061086		0.99812		787.40	70.8	0.00018		3 30 14.04
0.0024	0.061166		0.99812		787.70	70.6	0.00018		3 31 34.66
0.0025	0.061246	10.0	0.99811	0.6	8.78859	70.5	0.00018	0.3	3 31 55.29
0.0026	0.061326		0.99810		789.11	70.4	0.00018		3 31 45.91
0.0027	0.061406		0.99810		790.01	70.3	0.00017		3 31 66.54
0.0028	0.061486		0.99809		790.71	70.2	0.00017		3 31 87.17
0.0029	0.061565		0.99808		791.41	70.1	0.00017		3 31 47.79
0.0030	0.061646	10.0	0.99808	0.6	8.79211	70.0	0.00016	0.3	3 31 68.42
0.0031	0.061726		0.99807		792.81	69.8	0.00016		3 31 89.04
0.0032	0.061806		0.99807		793.51	69.7	0.00016		3 31 49.67
0.0033	0.061886		0.99806		794.21	69.6	0.00016		3 31 70.30
0.0034	0.061966		0.99805		794.90	69.5	0.00015		3 31 90.93
0.0035	0.062046	10.0	0.99805	0.6	8.79560	69.4	0.00015	0.3	3 31 51.55
0.0036	0.062126		0.99804		795.60	69.3	0.00015		3 31 72.18
0.0037	0.062206		0.99804		796.28	69.2	0.00015		3 31 92.80
0.0038	0.062286		0.99803		797.67	69.1	0.00014		3 31 53.43
0.0039	0.062366		0.99802		798.36	69.0	0.00014		3 31 74.06
0.0040	0.062446	10.0	0.99802	0.6	8.79905	68.8	0.00014	0.3	3 31 94.68
0.0041	0.062526		0.99801		799.71	68.7	0.00014		3 31 75.31
0.0042	0.062606		0.99800		800.13	68.6	0.00014		3 31 95.94
0.0043	0.062686		0.99800		801.11	68.5	0.00014		3 31 76.56
0.0044	0.062766		0.99799		801.80	68.4	0.00014		3 31 97.19
0.0045	0.062846	10.0	0.99798	0.6	8.80248	68.3	0.00014	0.3	3 31 77.82
0.0046	0.062926		0.99798		803.16	68.2	0.00014		3 31 98.44
0.0047	0.063006		0.99797		803.85	68.1	0.00014		3 31 79.07
0.0048	0.063086		0.99797		804.53	68.0	0.00014		3 31 99.69
0.0049	0.063166		0.99796		805.21	67.9	0.00014		3 31 40.32
0.0050	0.063246	10.0	0.99795	0.6	8.80588	67.8	0.00014	0.3	3 31 60.95
0.0051	0.063326		0.99795		806.56	67.7	0.00014		3 31 81.57
0.0052	0.063406		0.99794		807.24	67.6	0.00014		3 31 42.20
0.0053	0.063486		0.99793		807.91	67.4	0.00014		3 31 62.83
0.0054	0.063566		0.99793		808.59	67.3	0.00014		3 31 83.45
0.0055	0.063646	10.0	0.99792	0.6	8.80926	67.2	0.00014	0.3	3 31 44.08
0.0056	0.063726		0.99791		809.93	67.1	0.00014		3 31 64.71
0.0057	0.063806		0.99791		810.60	67.0	0.00014		3 31 85.33
0.0058	0.063886		0.99790		811.27	66.9	0.00014		3 31 45.96
0.0059	0.063966		0.99789		811.94	66.8	0.00014		3 31 66.59
0.0060	0.064046	10.0	0.99789	0.6	8.81261	66.7	0.00014	0.3	3 31 87.21
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0650	0.06495	10.0	0.99789	0.6	8.81261	66.7	9.99908	0.3	3 43 27.21
.0651	.06505		.99788	.7	.81327	66.6	.99908		3 43 47.84
.0652	.06515		.99783		.81394	66.5	.99908		3 44 08.47
.0653	.06525		.99787		.81460	66.4	.99907		3 44 29.09
.0654	.06535		.99785		.81527	66.3	.99907		3 44 49.72
0.0655	0.06545	10.0	0.99785	0.7	8.81593	66.2	9.99907	0.3	3 45 10.34
.0656	.06555		.99785		.81659	66.1	.99906		3 45 30.97
.0657	.06565		.99784		.81725	66.0	.99905		3 45 51.60
.0658	.06575		.99784		.81791	65.9	.99905		3 46 12.22
.0659	.06585		.99783		.81857	65.8	.99905		3 46 32.85
0.0660	0.06595	10.0	0.99782	0.7	8.81923	65.7	9.99905	0.3	3 46 53.48
.0661	.06605		.99782		.81989	65.6	.99905		3 47 14.10
.0662	.06615		.99781		.82054	65.5	.99905		3 47 34.73
.0663	.06625		.99780		.82120	65.4	.99904		3 47 55.36
.0664	.06635		.99780		.82185	65.3	.99904		3 48 15.98
0.0665	0.06645	10.0	0.99779	0.7	8.82250	65.2	9.99904	0.3	3 48 36.61
.0666	.06655		.99778		.82315	65.1	.99904		3 48 57.24
.0667	.06665		.99778		.82380	65.0	.99903		3 49 17.85
.0668	.06675		.99777		.82445	64.9	.99903		3 49 38.49
.0669	.06685		.99776		.82510	64.8	.99903		3 49 59.12
0.0670	0.06695	10.0	0.99776	0.7	8.82575	64.7	9.99902	0.3	3 50 19.74
.0671	.06705		.99775		.82640	64.6	.99902		3 50 40.37
.0672	.06715		.99774		.82704	64.5	.99902		3 51 00.99
.0673	.06725		.99774		.82769	64.4	.99902		3 51 21.62
.0674	.06735		.99773		.82833	64.3	.99901		3 51 42.25
0.0675	0.06745	10.0	0.99772	0.7	8.82897	64.2	9.99901	0.3	3 52 02.87
.0676	.06755		.99772		.82962	64.1	.99901		3 52 23.50
.0677	.06765		.99771		.83026	64.1	.99900		3 52 44.13
.0678	.06775		.99770		.83090	64.0	.99900		3 53 04.75
.0679	.06785		.99770		.83154	63.9	.99900		3 53 25.38
0.0680	0.06795	10.0	0.99769	0.7	8.83217	63.8	9.99900	0.3	3 53 46.01
.0681	.06805		.99768		.83281	63.7	.99899		3 54 06.63
.0682	.06815		.99768		.83345	63.6	.99899		3 54 27.26
.0683	.06825		.99767		.83408	63.5	.99899		3 54 47.89
.0684	.06835		.99766		.83472	63.4	.99898		3 55 08.51
0.0685	0.06845	10.0	0.99765	0.7	8.83535	63.3	9.99898	0.3	3 55 29.14
.0686	.06855		.99765		.83598	63.2	.99898		3 55 49.77
.0687	.06865		.99764		.83662	63.1	.99897		3 56 10.39
.0688	.06875		.99763		.83725	63.0	.99897		3 56 31.02
.0689	.06885		.99763		.83788	62.9	.99897		3 56 51.65
0.0690	0.06895	10.0	0.99762	0.7	8.83850	62.8	9.99897	0.3	3 57 12.27
.0691	.06905		.99761		.83913	62.8	.99896		3 57 32.90
.0692	.06914		.99761		.83976	62.7	.99896		3 57 53.52
.0693	.06924		.99760		.84039	62.6	.99896		3 58 14.15
.0694	.06934		.99759		.84101	62.5	.99895		3 58 34.78
0.0695	0.06944	10.0	0.99759	0.7	8.84164	62.4	9.99895	0.3	3 58 55.40
.0696	.06954		.99758		.84226	62.3	.99895		3 59 16.03
.0697	.06964		.99757		.84288	62.2	.99894		3 59 36.66
.0698	.06974		.99756		.84350	62.1	.99894		3 59 57.28
.0699	.06984		.99756		.84412	62.0	.99894		4 00 17.91
0.0700	0.06994	10.0	0.99755	0.7	8.84474	61.9	9.99894	0.3	4 00 38.54
$u$	$-1 \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{1}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$\eta$
0.0700	0.05994	10.0	0.99755	0.7	8.84474	61.0	9.98304	0.3	4 00 38.54
.0701	.07004		.99754		.84536	61.0	.98303		4 00 50.16
.0702	.07014		.99754		.84598	61.3	.98303		4 00 10.70
.0703	.07024		.99753		.84660	61.7	.98303		4 01 30.42
.0704	.07034		.99752		.84721	61.0	.98303		4 02 01.04
0.0705	0.07044	10.0	0.99753	0.7	8.84783	61.5	9.98303	0.3	4 02 31.67
.0706	.07054		.99751		.84844	61.4	.98302		4 03 42.30
.0707	.07064		.99750		.84905	61.3	.98301		4 03 02.92
.0708	.07074		.99749		.84967	61.2	.98301		4 03 23.55
.0709	.07084		.99749		.85028	61.2	.98301		4 03 44.17
0.0710	0.07094	10.0	0.99748	0.7	8.85089	61.1	9.98300	0.3	4 04 04.80
.0711	.07104		.99747		.85150	61.0	.98300		4 04 25.43
.0712	.07114		.99747		.85211	60.9	.98300		4 04 46.05
.0713	.07124		.99746		.85272	60.8	.98300		4 05 06.68
.0714	.07134		.99745		.85333	60.7	.98300		4 05 27.31
0.0715	0.07144	10.0	0.99744	0.7	8.85394	60.6	9.98300	0.3	4 05 47.93
.0716	.07154		.99744		.85454	60.6	.98300		4 06 08.56
.0717	.07164		.99743		.85515	60.5	.98300		4 06 29.19
.0718	.07174		.99742		.85575	60.4	.98300		4 06 49.81
.0719	.07184		.99742		.85635	60.3	.98300		4 07 10.44
0.0720	0.07194	10.0	0.99741	0.7	8.85696	60.2	9.98300	0.3	4 07 31.07
.0721	.07204		.99740		.85756	60.1	.98300		4 07 51.60
.0722	.07214		.99739		.85816	60.1	.98300		4 08 12.22
.0723	.07224		.99739		.85876	60.0	.98300		4 08 32.85
.0724	.07234		.99738		.85936	59.9	.98300		4 08 53.47
0.0725	0.07244	10.0	0.99737	0.7	8.85996	59.8	9.98300	0.3	4 09 14.10
.0726	.07254		.99737		.86056	59.7	.98300		4 09 34.72
.0727	.07264		.99736		.86115	59.6	.98300		4 09 55.35
.0728	.07274		.99735		.86175	59.6	.98300		4 10 15.98
.0729	.07284		.99734		.86234	59.5	.98300		4 10 36.60
0.0730	0.07294	10.0	0.99734	0.7	8.86294	59.4	9.98300	0.3	4 10 57.23
.0731	.07304		.99733		.86353	59.3	.98300		4 11 17.85
.0732	.07314		.99732		.86413	59.2	.98300		4 11 38.48
.0733	.07324		.99731		.86472	59.1	.98300		4 11 59.11
.0734	.07333		.99731		.86531	59.1	.98300		4 12 19.74
0.0735	0.07343	10.0	0.99730	0.7	8.86590	59.0	9.98300	0.3	4 12 40.37
.0736	.07353		.99729		.86649	58.9	.98300		4 13 00.99
.0737	.07363		.99729		.86707	58.8	.98300		4 13 21.62
.0738	.07373		.99728		.86766	58.7	.98300		4 13 42.24
.0739	.07383		.99727		.86825	58.7	.98300		4 14 02.87
0.0740	0.07393	10.0	0.99725	0.7	8.86884	58.6	9.98300	0.3	4 14 23.50
.0741	.07403		.99725		.86943	58.5	.98300		4 14 44.12
.0742	.07413		.99725		.87001	58.4	.98300		4 15 04.75
.0743	.07423		.99724		.87059	58.3	.98300		4 15 25.38
.0744	.07433		.99723		.87117	58.3	.98300		4 15 46.00
0.0745	0.07443	10.0	0.99723	0.7	8.87175	58.2	9.98300	0.3	4 16 06.63
.0746	.07453		.99722		.87234	58.1	.98300		4 16 27.25
.0747	.07463		.99721		.87292	58.0	.98300		4 16 47.88
.0748	.07473		.99720		.87350	58.0	.98300		4 17 08.50
.0749	.07483		.99720		.87408	57.9	.98300		4 17 29.13
0.0750	0.07493	10.0	0.99719	0.7	8.87465	57.8	9.98300	0.3	4 17 49.76
$u$	$-1 \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0750	0.07493	10.0	0.99719	0.7	8.87465	57.8	9.99878	0.3	4 17 49.86
.0751	.07503		.99718	0.8	.87523	57.7	.99877		4 18 10.49
.0752	.07513		.99717		.87581	57.6	.99877		4 18 31.11
.0753	.07523		.99717		.87638	57.6	.99877		4 18 51.74
.0754	.07533		.99716		.87695	57.5	.99876		4 19 12.37
0.0755	0.07543	10.0	0.99715	0.8	8.87753	57.4	9.99876	0.3	4 19 32.99
.0756	.07553		.99714		.87811	57.3	.99876		4 19 53.62
.0757	.07563		.99714		.87868	57.3	.99875		4 20 14.25
.0758	.07573		.99713		.87925	57.2	.99875		4 20 34.87
.0759	.07583		.99712		.87982	57.1	.99875		4 20 55.50
0.0760	0.07593	10.0	0.99711	0.8	8.88040	57.0	9.99874	0.3	4 21 16.13
.0761	.07603		.99711		.88097	57.0	.99874		4 21 36.75
.0762	.07613		.99710		.88153	56.9	.99874		4 21 57.38
.0763	.07623		.99709		.88210	56.8	.99873		4 22 18.00
.0764	.07633		.99708		.88267	56.7	.99873		4 22 38.63
0.0765	0.07643	10.0	0.99708	0.8	8.88324	56.7	9.99873	0.3	4 22 59.26
.0766	.07653		.99707		.88380	56.6	.99872		4 23 19.88
.0767	.07662		.99706		.88437	56.5	.99872		4 23 40.51
.0768	.07672		.99705		.88493	56.4	.99872		4 24 01.14
.0769	.07682		.99704		.88550	56.4	.99871		4 24 21.76
0.0770	0.07692	10.0	0.99704	0.8	8.88606	56.3	9.99871	0.3	4 24 42.39
.0771	.07702		.99703		.88562	56.2	.99871		4 25 03.02
.0772	.07712		.99702		.88619	56.1	.99870		4 25 23.64
.0773	.07722		.99701		.88675	56.1	.99870		4 25 44.27
.0774	.07732		.99701		.88731	56.0	.99870		4 26 04.90
0.0775	0.07742	10.0	0.99700	0.8	8.88887	55.9	9.99869	0.3	4 26 25.52
.0776	.07752		.99699		.88943	55.9	.99869		4 26 46.15
.0777	.07762		.99698		.88998	55.8	.99869		4 27 06.78
.0778	.07772		.99698		.89054	55.7	.99868		4 27 27.40
.0779	.07782		.99697		.89110	55.6	.99868		4 27 48.03
0.0780	0.07792	10.0	0.99696	0.8	8.89165	55.6	9.99868	0.3	4 28 08.65
.0781	.07802		.99695		.89221	55.5	.99867		4 28 29.28
.0782	.07812		.99694		.89276	55.4	.99867		4 28 49.91
.0783	.07822		.99694		.89332	55.4	.99867		4 29 10.53
.0784	.07832		.99693		.89387	55.3	.99866		4 29 31.16
0.0785	0.07842	10.0	0.99692	0.8	8.89442	55.2	9.99866	0.3	4 29 51.79
.0786	.07852		.99691		.89498	55.1	.99866		4 30 12.41
.0787	.07862		.99690		.89553	55.1	.99865		4 30 33.04
.0788	.07872		.99690		.89608	55.0	.99865		4 30 53.67
.0789	.07882		.99689		.89663	54.9	.99865		4 31 14.29
0.0790	0.07892	10.0	0.99688	0.8	8.89718	54.9	9.99864	0.3	4 31 34.92
.0791	.07902		.99687		.89772	54.8	.99864		4 31 55.55
.0792	.07912		.99687		.89827	54.7	.99864		4 32 16.17
.0793	.07922		.99686		.89882	54.7	.99863		4 32 36.80
.0794	.07932		.99685		.89936	54.6	.99863		4 32 57.43
0.0795	0.07942	10.0	0.99684	0.8	8.89991	54.6	9.99863	0.3	4 33 18.05
.0796	.07952		.99683		.90045	54.4	.99862		4 33 38.68
.0797	.07962		.99683		.90100	54.4	.99862		4 33 59.31
.0798	.07972		.99682		.90154	54.3	.99862		4 34 19.93
.0799	.07982		.99681		.90208	54.2	.99861		4 34 40.56
0.0800	0.07991	10.0	0.99680	0.8	8.90263	54.2	9.99861	0.3	4 35 01.18
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_u'$	$\cos u$	$\omega F_u'$	$\log \sin u$	$\omega F_u'$	$\log \cos u$	$\omega F_u'$	$u$
0.0800	0.07991	10.0	0.99980	0.8	8.00533	54.2	0.00000	0.0	" " 0.18
0.0801	0.8001		0.99979		8.00532	54.1	0.00001		4.35 01.18
0.0802	0.8002		0.99978		8.00531	54.0	0.00002		4.35 01.81
0.0803	0.8003		0.99977		8.00530	53.9	0.00003		4.35 02.44
0.0804	0.8004		0.99976		8.00529	53.8	0.00004		4.35 03.06
0.0805	0.8005	10.0	0.99975	0.8	8.00528	53.7	0.00005	0.0	4.36 03.69
0.0806	0.8006		0.99974		8.00527	53.6	0.00006		4.36 04.32
0.0807	0.8007		0.99973		8.00526	53.5	0.00007		4.36 04.94
0.0808	0.8008		0.99972		8.00525	53.4	0.00008		4.36 05.57
0.0809	0.8009		0.99971		8.00524	53.3	0.00009		4.36 06.20
0.0810	0.8010	10.0	0.99970	0.8	8.00523	53.2	0.00010	0.0	4.36 06.82
0.0811	0.8011		0.99969		8.00522	53.1	0.00011		4.36 07.45
0.0812	0.8012		0.99968		8.00521	53.0	0.00012		4.36 08.08
0.0813	0.8013		0.99967		8.00520	52.9	0.00013		4.36 08.70
0.0814	0.8014		0.99966		8.00519	52.8	0.00014		4.36 09.33
0.0815	0.8015	10.0	0.99965	0.8	8.00518	52.7	0.00015	0.0	4.36 09.96
0.0816	0.8016		0.99964		8.00517	52.6	0.00016		4.36 10.58
0.0817	0.8017		0.99963		8.00516	52.5	0.00017		4.36 11.21
0.0818	0.8018		0.99962		8.00515	52.4	0.00018		4.36 11.83
0.0819	0.8019		0.99961		8.00514	52.3	0.00019		4.36 12.46
0.0820	0.8020	10.0	0.99960	0.8	8.00513	52.2	0.00020	0.0	4.36 13.09
0.0821	0.8021		0.99959		8.00512	52.1	0.00021		4.36 13.71
0.0822	0.8022		0.99958		8.00511	52.0	0.00022		4.36 14.34
0.0823	0.8023		0.99957		8.00510	51.9	0.00023		4.36 14.97
0.0824	0.8024		0.99956		8.00509	51.8	0.00024		4.36 15.59
0.0825	0.8025	10.0	0.99955	0.8	8.00508	51.7	0.00025	0.0	4.36 16.22
0.0826	0.8026		0.99954		8.00507	51.6	0.00026		4.36 16.85
0.0827	0.8027		0.99953		8.00506	51.5	0.00027		4.36 17.47
0.0828	0.8028		0.99952		8.00505	51.4	0.00028		4.36 18.10
0.0829	0.8029		0.99951		8.00504	51.3	0.00029		4.36 18.73
0.0830	0.8030	10.0	0.99950	0.8	8.00503	51.2	0.00030	0.0	4.36 19.35
0.0831	0.8031		0.99949		8.00502	51.1	0.00031		4.36 20.08
0.0832	0.8032		0.99948		8.00501	51.0	0.00032		4.36 20.71
0.0833	0.8033		0.99947		8.00500	50.9	0.00033		4.36 21.33
0.0834	0.8034		0.99946		8.00499	50.8	0.00034		4.36 21.96
0.0835	0.8035	10.0	0.99945	0.8	8.00498	50.7	0.00035	0.0	4.36 22.58
0.0836	0.8036		0.99944		8.00497	50.6	0.00036		4.36 23.21
0.0837	0.8037		0.99943		8.00496	50.5	0.00037		4.36 23.84
0.0838	0.8038		0.99942		8.00495	50.4	0.00038		4.36 24.46
0.0839	0.8039		0.99941		8.00494	50.3	0.00039		4.36 25.09
0.0840	0.8040	10.0	0.99940	0.8	8.00493	50.2	0.00040	0.0	4.36 25.71
0.0841	0.8041		0.99939		8.00492	50.1	0.00041		4.36 26.34
0.0842	0.8042		0.99938		8.00491	50.0	0.00042		4.36 26.97
0.0843	0.8043		0.99937		8.00490	49.9	0.00043		4.36 27.59
0.0844	0.8044		0.99936		8.00489	49.8	0.00044		4.36 28.22
0.0845	0.8045	10.0	0.99935	0.8	8.00488	49.7	0.00045	0.0	4.36 28.84
0.0846	0.8046		0.99934		8.00487	49.6	0.00046		4.36 29.47
0.0847	0.8047		0.99933		8.00486	49.5	0.00047		4.36 30.09
0.0848	0.8048		0.99932		8.00485	49.4	0.00048		4.36 30.72
0.0849	0.8049		0.99931		8.00484	49.3	0.00049		4.36 31.34
0.0850	0.8050	10.0	0.99930	0.8	8.00483	49.2	0.00050	0.0	4.36 31.97
0.0851	0.8051		0.99929		8.00482	49.1	0.00051		4.36 32.59
0.0852	0.8052		0.99928		8.00481	49.0	0.00052		4.36 33.22
0.0853	0.8053		0.99927		8.00480	48.9	0.00053		4.36 33.84
0.0854	0.8054		0.99926		8.00479	48.8	0.00054		4.36 34.47
0.0855	0.8055	10.0	0.99925	0.8	8.00478	48.7	0.00055	0.0	4.36 35.09
0.0856	0.8056		0.99924		8.00477	48.6	0.00056		4.36 35.72
0.0857	0.8057		0.99923		8.00476	48.5	0.00057		4.36 36.34
0.0858	0.8058		0.99922		8.00475	48.4	0.00058		4.36 36.97
0.0859	0.8059		0.99921		8.00474	48.3	0.00059		4.36 37.59
0.0860	0.8060	10.0	0.99920	0.8	8.00473	48.2	0.00060	0.0	4.36 38.22
0.0861	0.8061		0.99919		8.00472	48.1	0.00061		4.36 38.84
0.0862	0.8062		0.99918		8.00471	48.0	0.00062		4.36 39.47
0.0863	0.8063		0.99917		8.00470	47.9	0.00063		4.36 40.09
0.0864	0.8064		0.99916		8.00469	47.8	0.00064		4.36 40.72
0.0865	0.8065	10.0	0.99915	0.8	8.00468	47.7	0.00065	0.0	4.36 41.34
0.0866	0.8066		0.99914		8.00467	47.6	0.00066		4.36 41.97
0.0867	0.8067		0.99913		8.00466	47.5	0.00067		4.36 42.59
0.0868	0.8068		0.99912		8.00465	47.4	0.00068		4.36 43.22
0.0869	0.8069		0.99911		8.00464	47.3	0.00069		4.36 43.84
0.0870	0.8070	10.0	0.99910	0.8	8.00463	47.2	0.00070	0.0	4.36 44.47
0.0871	0.8071		0.99909		8.00462	47.1	0.00071		4.36 45.09
0.0872	0.8072		0.99908		8.00461	47.0	0.00072		4.36 45.72
0.0873	0.8073		0.99907		8.00460	46.9	0.00073		4.36 46.34
0.0874	0.8074		0.99906		8.00459	46.8	0.00074		4.36 46.97
0.0875	0.8075	10.0	0.99905	0.8	8.00458	46.7	0.00075	0.0	4.36 47.59
0.0876	0.8076		0.99904		8.00457	46.6	0.00076		4.36 48.22
0.0877	0.8077		0.99903		8.00456	46.5	0.00077		4.36 48.84
0.0878	0.8078		0.99902		8.00455	46.4	0.00078		4.36 49.47
0.0879	0.8079		0.99901		8.00454	46.3	0.00079		4.36 50.09
0.0880	0.8080	10.0	0.99900	0.8	8.00453	46.2	0.00080	0.0	4.36 50.72
0.0881	0.8081		0.99899		8.00452	46.1	0.00081		4.36 51.34
0.0882	0.8082		0.99898		8.00451	46.0	0.00082		4.36 51.97
0.0883	0.8083		0.99897		8.00450	45.9	0.00083		4.36 52.59
0.0884	0.8084		0.99896		8.00449	45.8	0.00084		4.36 53.22
0.0885	0.8085	10.0	0.99895	0.8	8.00448	45.7	0.00085	0.0	4.36 53.84
0.0886	0.8086		0.99894		8.00447	45.6	0.00086		4.36 54.47
0.0887	0.8087		0.99893		8.00446	45.5	0.00087		4.36 55.09
0.0888	0.8088		0.99892		8.00445	45.4	0.00088		4.36 55.72
0.0889	0.8089		0.99891		8.00444	45.3	0.00089		4.36 56.34
0.0890	0.8090	10.0	0.99890	0.8	8.00443	45.2	0.00090	0.0	4.36 56.97
0.0891	0.8091		0.99889		8.00442	45.1	0.00091		4.36 57.59
0.0892	0.8092		0.99888		8.00441	45.0	0.00092		4.36 58.22
0.0893	0.8093		0.99887		8.00440	44.9	0.00093		4.36 58.84
0.0894	0.8094		0.99886		8.00439	44.8	0.00094		4.36 59.47
0.0895	0.8095	10.0	0.99885	0.8	8.00438	44.7	0.00095	0.0	4.36 60.09
0.0896	0.8096		0.99884		8.00437	44.6	0.00096		4.36 60.72
0.0897	0.8097		0.99883		8.00436	44.5	0.00097		4.36 61.34
0.0898	0.8098		0.99882		8.00435	44.4	0.00098		4.36 61.97
0.0899	0.8099		0.99881		8.00434	44.3	0.00099		4.36 62.59
0.0900	0.8100	10.0	0.99880	0.8	8.00433	44.2	0.00100	0.0	4.36 63.22

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## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0850	0.08460	10.0	0.99639	0.8	8.92860	51.0	9.99843	0.4	4 52 12.51
.0851	.08500		.99638	0.8	.92941	50.9	.99843		4 52 33.14
.0852	.08510		.99637	0.9	.92991	50.9	.99842		4 52 53.76
.0853	.08520		.99636		.93042	50.8	.99842		4 53 14.39
.0854	.08530		.99636		.93093	50.7	.99841		4 53 35.01
0.0855	0.08540	10.0	0.99635	0.9	8.93144	50.7	9.99841	0.4	4 53 55.64
.0856	.08550		.99634		.93194	50.6	.99841		4 54 16.27
.0857	.08560		.99633		.93245	50.6	.99840		4 54 36.89
.0858	.08560		.99632		.93295	50.5	.99840		4 54 57.52
.0859	.08570		.99631		.93346	50.4	.99840		4 55 18.15
0.0860	0.08580	10.0	0.99630	0.9	8.93396	50.4	9.99839	0.4	4 55 38.77
.0861	.08590		.99630		.93447	50.3	.99839		4 55 59.40
.0862	.08600		.99629		.93497	50.3	.99838		4 56 20.03
.0863	.08610		.99628		.93547	50.2	.99838		4 56 40.65
.0864	.08620		.99627		.93597	50.1	.99838		4 57 01.28
0.0865	0.08630	10.0	0.99626	0.9	8.93647	50.1	9.99837	0.4	4 57 21.91
.0866	.08640		.99625		.93697	50.0	.99837		4 57 42.53
.0867	.08650		.99624		.93747	50.0	.99837		4 58 03.16
.0868	.08660		.99624		.93797	49.9	.99836		4 58 23.79
.0869	.08670		.99623		.93847	49.9	.99836		4 58 44.41
0.0870	0.08680	10.0	0.99622	0.9	8.93897	49.8	9.99835	0.4	4 59 05.04
.0871	.08690		.99621		.93947	49.7	.99835		4 59 25.66
.0872	.08700		.99620		.93997	49.7	.99835		4 59 46.29
.0873	.08710		.99619		.94046	49.6	.99834		5 00 06.92
.0874	.08720		.99618		.94096	49.6	.99834		5 00 27.54
0.0875	0.08730	10.0	0.99617	0.9	8.94145	49.5	9.99834	0.4	5 00 48.17
.0876	.08740		.99617		.94195	49.5	.99833		5 01 08.80
.0877	.08750		.99616		.94244	49.4	.99833		5 01 29.42
.0878	.08760		.99615		.94294	49.3	.99832		5 01 50.05
.0879	.08770		.99614		.94343	49.3	.99832		5 02 10.68
0.0880	0.08780	10.0	0.99613	0.9	8.94392	49.2	9.99832	0.4	5 02 31.30
.0881	.08790		.99612		.94441	49.2	.99831		5 02 51.93
.0882	.08800		.99611		.94491	49.1	.99831		5 03 12.55
.0883	.08810		.99610		.94540	49.1	.99830		5 03 33.18
.0884	.08820		.99610		.94589	49.0	.99830		5 03 53.81
0.0885	0.08830	10.0	0.99609	0.9	8.94638	48.9	9.99830	0.4	5 04 14.44
.0886	.08840		.99608		.94687	48.9	.99829		5 04 35.06
.0887	.08850		.99607		.94735	48.8	.99829		5 04 55.69
.0888	.08860		.99606		.94784	48.8	.99829		5 05 16.31
.0889	.08870		.99605		.94833	48.7	.99828		5 05 36.94
0.0890	0.08880	10.0	0.99604	0.9	8.94882	48.7	9.99828	0.4	5 05 57.57
.0891	.08890		.99603		.94930	48.6	.99827		5 06 18.19
.0892	.08900		.99602		.94979	48.6	.99827		5 06 38.82
.0893	.08910		.99602		.95027	48.5	.99827		5 06 59.45
.0894	.08920		.99601		.95076	48.4	.99826		5 07 20.07
0.0895	0.08930	10.0	0.99600	0.9	8.95124	48.4	9.99826	0.4	5 07 40.70
.0896	.08940		.99599		.95173	48.3	.99825		5 08 01.33
.0897	.08950		.99598		.95221	48.3	.99825		5 08 21.95
.0898	.08960		.99597		.95269	48.2	.99825		5 08 42.58
.0899	.08970		.99596		.95317	48.2	.99824		5 09 03.21
0.0900	0.08980	10.0	0.99595	0.9	8.95366	48.1	9.99824	0.4	5 09 23.83
$u$	$\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$



## Circular Functions.

$\alpha$	$\sin \alpha$	$\omega F_{\alpha}'$	$\cos \alpha$	$\omega F_{\alpha}'$	$\log \sin \alpha$	$\omega F_{\alpha}'$	$\log \cos \alpha$	$\omega F_{\alpha}'$	$\alpha$
0.0900	0.08988	0.0	0.99505	0.9	8.95366	48.1	9.96824	0.1	5 00 23.83
.0001	.08993		.99501		.95414	48.1	.96824		5 00 44.46
.0002	.09008		.99503		.95462	48.0	.96833		5 00 05.09
.0003	.09018		.99503		.95510	48.0	.96843		5 10 25.71
.0004	.09028		.99504		.95558	47.9	.96852		5 10 46.34
0.0905	0.09038	10.0	0.99501	0.9	8.95566	47.9	9.96853	0.4	5 11 06.96
.0006	.09048		.99500		.95614	47.8	.96862		5 11 27.59
.0007	.09058		.99500		.95661	47.8	.96871		5 11 48.22
.0008	.09068		.99500		.95709	47.7	.96881		5 12 08.84
.0009	.09077		.99500		.95757	47.6	.96890		5 12 29.47
0.0910	0.09087	10.0	0.99500	0.9	8.95814	47.6	9.96890	0.4	5 12 50.10
.0011	.09097		.99500		.95862	47.5	.96900		5 13 10.72
.0012	.09107		.99501		.95910	47.5	.96910		5 13 31.35
.0013	.09117		.99501		.95957	47.4	.96919		5 13 51.98
.0014	.09127		.99501		.96005	47.4	.96928		5 14 12.60
0.0915	0.09137	10.0	0.99501	0.9	8.96081	47.3	9.96928	0.4	5 14 33.23
.0016	.09147		.99501		.96129	47.3	.96938		5 14 53.86
.0017	.09157		.99501		.96176	47.2	.96947		5 15 14.48
.0018	.09167		.99501		.96223	47.2	.96957		5 15 35.11
.0019	.09177		.99502		.96270	47.1	.96966		5 15 55.74
0.0920	0.09187	10.0	0.99502	0.9	8.96317	47.1	9.96966	0.4	5 16 16.36
.0021	.09197		.99502		.96365	47.0	.96976		5 16 36.99
.0022	.09207		.99502		.96412	47.0	.96985		5 16 57.62
.0023	.09217		.99502		.96459	46.9	.96995		5 17 18.24
.0024	.09227		.99502		.96507	46.9	.97004		5 17 38.87
0.0925	0.09237	10.0	0.99502	0.9	8.96554	46.8	9.97004	0.4	5 17 59.49
.0026	.09247		.99502		.96602	46.8	.97014		5 18 20.12
.0027	.09257		.99502		.96649	46.7	.97023		5 18 40.75
.0028	.09267		.99502		.96697	46.7	.97033		5 19 01.37
.0029	.09277		.99503		.96745	46.6	.97042		5 19 22.00
0.0930	0.09287	10.0	0.99503	0.9	8.96780	46.6	9.97042	0.4	5 19 42.63
.0031	.09297		.99503		.96828	46.5	.97052		5 20 03.25
.0032	.09307		.99503		.96876	46.5	.97061		5 20 23.88
.0033	.09316		.99503		.96924	46.4	.97071		5 20 44.51
.0034	.09326		.99503		.96972	46.4	.97080		5 21 05.13
0.0935	0.09336	10.0	0.99503	0.9	8.97018	46.3	9.97080	0.4	5 21 25.76
.0036	.09346		.99503		.97066	46.3	.97090		5 21 46.39
.0037	.09356		.99503		.97114	46.2	.97100		5 22 07.01
.0038	.09366		.99503		.97162	46.2	.97110		5 22 27.64
.0039	.09376		.99503		.97210	46.1	.97120		5 22 48.27
0.0940	0.09386	10.0	0.99503	0.9	8.97249	46.1	9.97120	0.4	5 23 08.89
.0041	.09396		.99503		.97297	46.0	.97130		5 23 29.52
.0042	.09406		.99503		.97345	46.0	.97140		5 23 50.14
.0043	.09416		.99503		.97393	45.9	.97150		5 24 10.77
.0044	.09426		.99503		.97441	45.9	.97160		5 24 31.40
0.0945	0.09436	10.0	0.99503	0.9	8.97479	45.8	9.97160	0.4	5 24 52.02
.0046	.09446		.99503		.97527	45.8	.97170		5 25 12.65
.0047	.09456		.99503		.97575	45.7	.97180		5 25 33.28
.0048	.09466		.99503		.97623	45.7	.97190		5 25 53.90
.0049	.09476		.99503		.97671	45.6	.97200		5 26 14.53
0.0950	0.09486	10.0	0.99503	0.9	8.97707	45.6	9.97200	0.4	5 26 35.16
$\alpha$	$-\log \sinh \alpha$	$\omega F_{\alpha}'$	$\cosh \alpha$	$\omega F_{\alpha}'$	$\log \sinh \alpha$	$\omega F_{\alpha}'$	$\log \cosh \alpha$	$\omega F_{\alpha}'$	$\alpha$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0''$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.0050	0.00485	10.0	0.99540	0.0	8.97707	45.6	9.99804	0.4	5 26' 35.16
0.0051	0.00490		0.99548	0.0	9.7753	45.5	9.99803		5 26 55.78
0.0052	0.00496		0.99547	1.41	9.7768	45.5	9.9803		5 27 10.41
0.0053	0.00501		0.99540		9.7814	45.4	9.9802		5 27 37.04
0.0054	0.00506		0.99545		9.7849	45.4	9.9802		5 27 57.66
0.0055	0.00515	10.0	0.99544	1.0	8.97934	45.3	9.99802	0.4	5 28 18.29
0.0056	0.00513		0.99543		9.7980	45.3	9.9801		5 28 38.92
0.0057	0.00515		0.99542		9.8025	45.2	9.9801		5 28 59.54
0.0058	0.00515		0.99541		9.8070	45.2	9.9800		5 29 20.17
0.0059	0.00515		0.99541		9.8115	45.1	9.9800		5 29 40.79
0.0060	0.00515	10.0	0.99540	1.0	8.98160	45.1	9.9800	0.4	5 30 01.42
0.0061	0.00515		0.99540		9.8205	45.1	9.9799		5 30 22.05
0.0062	0.00515		0.99538		9.8251	45.0	9.9799		5 30 42.67
0.0063	0.00513		0.99537		9.8295	45.0	9.9798		5 31 03.30
0.0064	0.00515		0.99536		9.8340	44.9	9.9798		5 31 23.93
0.0065	0.00515	10.0	0.99535	1.0	8.98385	44.9	9.9797	0.4	5 31 44.55
0.0066	0.00515		0.99534		9.8430	44.8	9.9797		5 32 05.18
0.0067	0.00515		0.99533		9.8475	44.8	9.9797		5 32 25.81
0.0068	0.00515		0.99532		9.8520	44.7	9.9796		5 32 46.43
0.0069	0.00515		0.99531		9.8564	44.7	9.9796		5 33 07.06
0.0070	0.00515	10.0	0.99530	1.0	8.98509	44.6	9.9795	0.4	5 33 27.69
0.0071	0.00515		0.99529		9.8554	44.6	9.9795		5 33 48.31
0.0072	0.00515		0.99528		9.8608	44.5	9.9795		5 34 08.94
0.0073	0.00515		0.99527		9.8643	44.5	9.9794		5 34 29.57
0.0074	0.00515		0.99525		9.8687	44.4	9.9794		5 34 50.19
0.0075	0.00515	10.0	0.99525	1.0	8.98832	44.4	9.9793	0.4	5 35 10.82
0.0076	0.00515		0.99524		9.8876	44.4	9.9793		5 35 31.45
0.0077	0.00515		0.99523		9.8920	44.3	9.9792		5 35 52.07
0.0078	0.00515		0.99522		9.8965	44.3	9.9792		5 36 12.70
0.0079	0.00515		0.99521		9.9009	44.2	9.9792		5 36 33.32
0.0080	0.00515	10.0	0.99520	1.0	8.99953	44.2	9.9791	0.4	5 36 53.95
0.0081	0.00515		0.99519		9.9097	44.1	9.9791		5 37 14.58
0.0082	0.00515		0.99518		9.9141	44.1	9.9790		5 37 35.20
0.0083	0.00515		0.99517		9.9185	44.0	9.9790		5 37 55.83
0.0084	0.00515		0.99516		9.9229	44.0	9.9789		5 38 16.46
0.0085	0.00515	10.0	0.99515	1.0	8.99273	43.9	9.9789	0.4	5 38 37.08
0.0086	0.00515		0.99514		9.9317	43.9	9.9789		5 38 57.71
0.0087	0.00515		0.99513		9.9361	43.9	9.9788		5 39 18.34
0.0088	0.00515		0.99512		9.9405	43.8	9.9788		5 39 38.96
0.0089	0.00515		0.99511		9.9449	43.8	9.9787		5 39 59.59
0.0090	0.00515	10.0	0.99510	1.0	8.99493	43.7	9.9787	0.4	5 40 20.22
0.0091	0.00515		0.99509		9.9536	43.7	9.9786		5 40 40.84
0.0092	0.00515		0.99508		9.9580	43.6	9.9785		5 41 01.47
0.0093	0.00515		0.99507		9.9624	43.6	9.9785		5 41 22.10
0.0094	0.00515		0.99506		9.9667	43.5	9.9785		5 41 42.72
0.0095	0.00515	10.0	0.99505	1.0	8.99711	43.5	9.9785	0.4	5 42 03.35
0.0096	0.00515		0.99504		9.9754	43.5	9.9784		5 42 23.97
0.0097	0.00515		0.99503		9.9798	43.4	9.9784		5 42 44.60
0.0098	0.00515		0.99502		9.9841	43.4	9.9783		5 43 05.23
0.0099	0.00515		0.99501		9.9884	43.3	9.9783		5 43 25.85
0.1000	0.09983	10.0	0.99500	1.0	8.99928	43.3	9.99782	0.4	5 43 46.48
$u$	$1/\sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$n$
0.100	0.09983	99.5	0.99500	10.0	8.99038	4.343	0.00782	4.4	5 43 46.48
.101	.10083	99.5	.99400	10.1	9.00358	4.385	.00778	4.4	5 47 42.75
.102	.10182	99.5	.99300	10.2	.00785	4.423	.00774	4.4	5 50 30.01
.103	.10282	99.5	.99170	10.3	.01207	4.542	.00769	4.5	5 54 05.38
.104	.10381	99.5	.99000	10.4	.01625	4.641	.00765	4.5	5 57 31.54
0.105	0.10481	99.4	0.99149	10.5	9.02040	4.721	0.00760	4.6	6 00 57.80
.105	.10580	99.4	.99139	10.6	.02449	4.882	.00756	4.6	6 04 34.07
.107	.10580	99.4	.99128	10.7	.03555	4.913	.00751	4.7	6 07 50.33
.108	.10779	99.4	.99117	10.8	.04358	4.936	.00746	4.7	6 11 16.60
.109	.10878	99.4	.99107	10.9	.05057	4.960	.00741	4.8	6 14 42.86
0.110	0.10978	99.4	0.99306	11.0	9.04052	4.932	0.00737	4.8	6 18 09.13
.111	.11077	99.4	.99385	11.1	.04443	4.946	.00732	4.8	6 21 35.39
.112	.11177	99.4	.99373	11.2	.05341	4.951	.00727	4.9	6 25 01.66
.113	.11276	99.4	.99362	11.3	.05815	4.957	.00722	4.9	6 28 27.93
.114	.11375	99.4	.99351	11.4	.05596	4.963	.00717	5.0	6 31 54.19
0.115	0.11475	99.3	0.99339	11.5	9.05974	4.960	0.00713	5.0	6 35 20.45
.116	.11574	99.3	.99328	11.6	.06448	4.967	.00707	5.1	6 38 46.72
.117	.11673	99.3	.99316	11.7	.06719	4.963	.00703	5.1	6 42 12.98
.118	.11773	99.3	.99305	11.8	.07087	4.969	.00697	5.1	6 45 39.25
.119	.11872	99.3	.99293	11.9	.07452	4.975	.00693	5.2	6 49 05.51
0.120	0.11972	99.3	0.99281	12.0	9.07814	4.962	0.00687	5.2	6 52 31.78
.121	.12070	99.3	.99269	12.1	.06973	4.972	.00681	5.3	6 55 58.04
.122	.12170	99.3	.99257	12.2	.07538	4.973	.00676	5.3	6 59 24.31
.123	.12269	99.2	.99245	12.3	.08881	4.973	.00671	5.4	7 02 50.57
.124	.12368	99.2	.99232	12.4	.09231	4.984	.00665	5.4	7 06 16.84
0.125	0.12467	99.2	0.99220	12.5	9.09578	4.976	0.00660	5.5	7 09 43.10
.126	.12567	99.2	.99207	12.6	.09822	4.980	.00654	5.5	7 13 09.37
.127	.12666	99.2	.99195	12.7	.10394	4.981	.00649	5.5	7 16 35.63
.128	.12765	99.2	.99182	12.8	.10902	4.981	.00643	5.6	7 20 01.90
.129	.12864	99.2	.99169	12.9	.10948	4.988	.00638	5.6	7 23 28.16
0.130	0.12963	99.2	0.99156	13.0	9.11272	4.982	0.00633	5.7	7 26 54.42
.131	.13063	99.1	.99143	13.1	.11603	4.986	.00628	5.7	7 30 20.69
.132	.13162	99.1	.99130	13.2	.11931	4.987	.00621	5.8	7 33 46.95
.133	.13261	99.1	.99117	13.3	.12257	4.987	.00615	5.8	7 37 13.22
.134	.13360	99.1	.99104	13.4	.12580	4.987	.00609	5.9	7 40 39.48
0.135	0.13459	99.1	0.99090	13.5	9.12901	4.987	0.00603	5.9	7 44 05.75
.136	.13558	99.1	.99077	13.6	.13220	4.987	.00597	5.9	7 47 32.01
.137	.13657	99.1	.99063	13.7	.13540	4.987	.00591	6.0	7 50 58.28
.138	.13756	99.0	.99049	13.8	.13850	4.987	.00585	6.0	7 54 24.54
.139	.13855	99.0	.99036	13.9	.14162	4.987	.00579	6.1	7 57 50.81
0.140	0.13954	99.0	0.99022	14.0	9.14471	4.987	0.00573	6.1	8 01 17.07
.141	.14053	99.0	.99008	14.1	.14778	4.987	.00567	6.2	8 04 43.34
.142	.14152	99.0	.98993	14.2	.15083	4.987	.00561	6.2	8 08 09.60
.143	.14251	99.0	.98979	14.3	.15385	4.987	.00554	6.3	8 11 35.87
.144	.14350	99.0	.98965	14.4	.15683	4.987	.00548	6.3	8 15 02.13
0.145	0.14449	99.0	0.98951	14.5	9.15985	4.987	0.00542	6.3	8 18 28.40
.146	.14548	98.9	.98936	14.6	.16281	4.987	.00535	6.4	8 21 54.66
.147	.14647	98.9	.98921	14.7	.16575	4.987	.00529	6.4	8 25 20.93
.148	.14746	98.9	.98907	14.8	.16868	4.987	.00523	6.5	8 28 47.19
.149	.14845	98.9	.98892	14.9	.17158	4.987	.00516	6.5	8 32 13.46
0.150	0.14944	98.9	0.98877	14.9	9.17446	4.987	0.00510	6.6	8 35 39.72
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_1'$	$\cos u$	$\omega F_2'$	$\log \sin u$	$\omega F_3'$	$\log \cos u$	$\omega F_4'$	$u$
0.150	0.14944	98.9	0.98977	14.9	9.17446	287.4	9.99510	6.6	8° 35' 30".72
.151	.15043	98.9	.98962	15.0	.17733	285.1	.99503	6.6	8 39 05.99
.152	.15142	98.8	.98947	15.1	.18017	283.5	.99496	6.7	8 42 32.25
.153	.15240	98.8	.98932	15.2	.18300	281.6	.99490	6.7	8 45 58.52
.154	.15339	98.8	.98917	15.3	.18580	279.8	.99483	6.7	8 49 24.78
0.155	0.15438	98.8	0.98901	15.4	9.18859	277.9	9.99476	6.8	8 52 51.04
.156	.15537	98.8	.98886	15.5	.19136	276.1	.99469	6.8	8 56 17.31
.157	.15635	98.8	.98870	15.6	.19411	274.3	.99463	6.9	8 59 43.57
.158	.15731	98.8	.98854	15.7	.19685	272.6	.99456	6.9	9 03 09.84
.159	.15833	98.7	.98839	15.8	.19957	270.8	.99449	7.0	9 06 36.10
0.160	0.15933	98.7	0.98823	15.9	9.20227	269.1	9.99442	7.0	9 10 02.37
.161	.16031	98.7	.98807	16.0	.20495	267.4	.99435	7.1	9 13 28.63
.162	.16129	98.7	.98791	16.1	.20761	265.7	.99428	7.1	9 16 54.90
.163	.16228	98.7	.98774	16.2	.21026	264.1	.99420	7.1	9 20 21.16
.164	.16327	98.7	.98758	16.3	.21290	262.4	.99413	7.2	9 23 47.43
0.165	0.16425	98.6	0.98742	16.4	9.21554	260.8	9.99406	7.2	9 27 13.69
.166	.16524	98.6	.98725	16.5	.21811	259.2	.99399	7.3	9 30 39.96
.167	.16623	98.6	.98709	16.6	.22070	257.6	.99392	7.3	9 34 06.22
.168	.16721	98.6	.98692	16.7	.22326	256.1	.99384	7.4	9 37 32.49
.169	.16820	98.6	.98675	16.8	.22582	254.5	.99377	7.4	9 40 58.75
0.170	0.16918	98.6	0.98658	16.9	9.22846	253.0	9.99369	7.5	9 44 25.02
.171	.17017	98.5	.98642	17.0	.23088	251.5	.99362	7.5	9 47 51.28
.172	.17115	98.5	.98624	17.1	.23348	250.0	.99354	7.5	9 51 17.55
.173	.17214	98.5	.98607	17.2	.23588	248.5	.99347	7.6	9 54 43.81
.174	.17313	98.5	.98590	17.3	.23836	247.1	.99339	7.6	9 58 10.08
0.175	0.17411	98.5	0.98573	17.4	9.24082	245.6	9.99332	7.7	10 01 36.34
.176	.17509	98.5	.98555	17.5	.24327	244.2	.99324	7.7	10 05 02.61
.177	.17608	98.4	.98538	17.6	.24570	242.8	.99316	7.8	10 08 28.87
.178	.17705	98.4	.98520	17.7	.24812	241.4	.99308	7.8	10 11 55.14
.179	.17805	98.4	.98502	17.8	.25053	240.0	.99300	7.9	10 15 21.40
0.180	0.17903	98.4	0.98484	17.9	9.25292	238.7	9.99293	7.9	10 18 47.67
.181	.18001	98.4	.98466	18.0	.25530	237.3	.99285	7.9	10 22 13.93
.182	.18100	98.3	.98448	18.1	.25767	236.0	.99277	8.0	10 25 40.19
.183	.18198	98.3	.98430	18.2	.26002	234.7	.99269	8.0	10 29 06.46
.184	.18296	98.3	.98412	18.3	.26236	233.4	.99261	8.1	10 32 32.72
0.185	0.18395	98.3	0.98394	18.4	9.26469	232.1	9.99253	8.1	10 35 58.99
.186	.18493	98.3	.98375	18.5	.26701	230.8	.99244	8.2	10 39 25.25
.187	.18591	98.3	.98357	18.6	.26931	229.5	.99236	8.2	10 42 51.52
.188	.18689	98.2	.98338	18.7	.27160	228.3	.99228	8.3	10 46 17.78
.189	.18788	98.2	.98319	18.8	.27387	227.0	.99220	8.3	10 49 44.05
0.190	0.18886	98.2	0.98300	18.9	9.27611	225.8	9.99211	8.4	10 53 10.31
.191	.18984	98.2	.98281	19.0	.27839	224.6	.99203	8.4	10 56 36.58
.192	.19082	98.2	.98262	19.1	.28063	223.4	.99195	8.4	11 00 02.84
.193	.19180	98.1	.98243	19.2	.28286	222.2	.99186	8.5	11 03 29.11
.194	.19279	98.1	.98224	19.3	.28507	221.0	.99178	8.5	11 06 55.37
0.195	0.19377	98.1	0.98205	19.4	9.28728	219.9	9.99169	8.6	11 10 21.64
.196	.19475	98.1	.98185	19.5	.28947	218.7	.99160	8.6	11 13 47.90
.197	.19573	98.1	.98166	19.6	.29165	217.6	.99152	8.7	11 17 14.17
.198	.19671	98.0	.98146	19.7	.29382	216.5	.99143	8.7	11 20 40.43
.199	.19769	98.0	.98126	19.8	.29598	215.3	.99134	8.8	11 24 06.70
0.200	0.19867	98.0	0.98107	19.9	9.29813	214.2	9.99126	8.8	11 27 32.96
$u$	$-\sin u$	$\omega F_1'$	$-\cos u$	$\omega F_2'$	$\log \frac{\sin u}{u}$	$\omega F_3'$	$\log \frac{\cos u}{u}$	$\omega F_4'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.200	0.19857	98.0	0.98007	19.9	9.29813	21.42	9.97126	8.8	11 27 34.06
.201	.19995	98.0	.97987	20.0	.30027	213.1	.99117	8.8	11 30 50.34
.202	.20093	98.0	.97967	20.1	.30239	212.1	.99168	8.9	11 34 25.49
.203	.20161	97.9	.97947	20.2	.30451	211.0	.99099	8.9	11 37 51.70
.204	.20259	97.9	.97926	20.3	.30661	209.9	.99060	9.0	11 41 18.04
0.205	0.20357	97.9	0.97905	20.4	9.30871	208.9	9.99081	9.0	11 44 44.39
.206	.20455	97.9	.97886	20.5	.31079	207.8	.99072	9.1	11 48 10.55
.207	.20552	97.9	.97865	20.6	.31286	206.8	.99063	9.1	11 51 36.81
.208	.20650	97.8	.97845	20.7	.31493	205.8	.99054	9.2	11 55 03.08
.209	.20748	97.8	.97824	20.7	.31698	204.8	.99044	9.2	11 58 29.34
0.210	0.20846	97.8	0.97803	20.8	9.31902	203.8	9.99035	9.3	12 01 55.61
.211	.20944	97.8	.97782	20.9	.32105	202.8	.99026	9.3	12 05 21.87
.212	.21042	97.8	.97761	21.0	.32308	201.8	.99017	9.3	12 08 48.14
.213	.21139	97.7	.97740	21.1	.32509	200.8	.99007	9.4	12 12 14.40
.214	.21237	97.7	.97719	21.2	.32709	199.8	.98998	9.4	12 15 40.67
0.215	0.21335	97.7	0.97698	21.3	9.32909	198.9	9.98988	9.5	12 19 06.93
.216	.21432	97.7	.97676	21.4	.33107	197.9	.98979	9.5	12 22 33.20
.217	.21530	97.7	.97655	21.5	.33305	197.0	.98969	9.6	12 25 59.46
.218	.21628	97.6	.97633	21.6	.33501	196.0	.98960	9.6	12 29 25.73
.219	.21725	97.6	.97612	21.7	.33697	195.1	.98950	9.7	12 32 51.99
0.220	0.21823	97.6	0.97590	21.8	9.33891	194.2	9.98940	9.7	12 36 18.26
.221	.21921	97.6	.97568	21.9	.34085	193.3	.98931	9.8	12 39 44.52
.222	.22018	97.5	.97546	22.0	.34278	192.4	.98921	9.8	12 43 10.79
.223	.22116	97.5	.97524	22.1	.34470	191.5	.98911	9.8	12 46 37.05
.224	.22213	97.5	.97502	22.2	.34661	190.6	.98901	9.9	12 50 03.32
0.225	0.22311	97.5	0.97479	22.3	9.34851	189.8	9.98891	9.9	12 53 29.58
.226	.22408	97.5	.97457	22.4	.35041	188.9	.98881	10.0	12 56 55.85
.227	.22505	97.4	.97435	22.5	.35229	188.0	.98871	10.0	13 00 22.11
.228	.22603	97.4	.97412	22.6	.35417	187.2	.98861	10.1	13 03 48.38
.229	.22700	97.4	.97389	22.7	.35603	186.3	.98851	10.1	13 07 14.64
0.230	0.22798	97.4	0.97367	22.8	9.35789	185.5	9.98841	10.2	13 10 40.91
.231	.22895	97.3	.97344	22.9	.35974	184.7	.98831	10.2	13 14 07.17
.232	.22992	97.3	.97321	23.0	.36158	183.8	.98821	10.3	13 17 33.44
.233	.23090	97.3	.97298	23.1	.36342	183.0	.98810	10.3	13 20 59.70
.234	.23187	97.3	.97275	23.2	.36525	182.2	.98800	10.4	13 24 25.96
0.235	0.23284	97.3	0.97251	23.3	9.36706	181.4	9.98790	10.4	13 27 52.23
.236	.23382	97.2	.97228	23.4	.36887	180.6	.98779	10.4	13 31 18.49
.237	.23479	97.2	.97205	23.5	.37068	179.8	.98769	10.5	13 34 44.76
.238	.23576	97.2	.97181	23.6	.37247	179.0	.98758	10.5	13 38 11.02
.239	.23673	97.2	.97158	23.7	.37426	178.2	.98748	10.6	13 41 37.29
0.240	0.23770	97.1	0.97134	23.8	9.37603	177.5	9.98737	10.6	13 45 03.55
.241	.23867	97.1	.97110	23.9	.37780	176.7	.98726	10.7	13 48 29.82
.242	.23964	97.1	.97086	24.0	.37957	175.9	.98716	10.7	13 51 56.08
.243	.24062	97.1	.97062	24.1	.38132	175.2	.98705	10.8	13 55 22.35
.244	.24159	97.0	.97038	24.2	.38307	174.4	.98694	10.8	13 58 48.61
0.245	0.24256	97.0	0.97014	24.3	9.38481	173.7	9.98683	10.9	14 02 14.88
.246	.24353	97.0	.96989	24.4	.38655	173.0	.98672	10.9	14 05 41.14
.247	.24450	97.0	.96965	24.4	.38827	172.2	.98662	11.0	14 09 07.41
.248	.24547	96.9	.96941	24.5	.38999	171.5	.98651	11.0	14 12 33.67
.249	.24643	96.9	.96916	24.6	.39170	170.8	.98640	11.0	14 15 59.94
0.250	0.24740	96.9	0.96891	24.7	9.39341	170.1	9.98628	11.1	14 19 26.20
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_u'$	$\cos u$	$\omega F_u'$	$\log \sin u$	$\omega F_u'$	$\log \cos u$	$\omega F_u'$	$u$
0.250	0.24740	0.90	0.96891	24.7	9.39341	170.1	9.98628	11.1	1 19 26.20
.251	.24847	0.90	.96890	24.8	.39510	169.4	.98517	11.1	1 22 52.47
.252	.24951	0.90	.96882	24.9	.39670	168.7	.98406	11.2	1 26 18.73
.253	.25051	0.90	.96877	25.0	.39818	168.0	.98305	11.2	1 29 45.00
.254	.25153	0.90	.96872	25.1	.40015	167.3	.98281	11.3	1 33 11.26
0.255	0.25255	0.90	0.96866	25.2	0.40182	166.6	9.98572	11.3	14 36 37.53
.256	.25351	0.90	.96861	25.3	.40349	165.9	.98561	11.4	1 40 03.79
.257	.25448	0.90	.96856	25.4	.40511	165.2	.98550	11.4	1 43 30.06
.258	.25545	0.90	.96850	25.5	.40670	164.6	.98538	11.5	1 46 56.32
.259	.25641	0.90	.96845	25.6	.40843	163.9	.98527	11.5	1 50 22.58
0.260	0.25743	0.90	0.96839	25.7	0.41007	163.3	9.98515	11.6	1 53 48.85
.261	.25846	0.90	.96834	25.8	.41170	162.6	.98504	11.6	1 57 15.11
.262	.25941	0.90	.96827	25.9	.41332	162.0	.98492	11.6	1 50 41.38
.263	.26038	0.90	.96821	26.0	.41491	161.3	.98480	11.7	1 54 07.64
.264	.26131	0.90	.96815	26.1	.41655	160.7	.98469	11.7	1 57 33.91
0.265	0.26231	0.90	0.96809	26.2	9.41815	160.0	9.98457	11.8	1 51 00.17
.266	.26327	0.90	.96803	26.3	.41975	159.4	.98445	11.8	1 54 26.44
.267	.26421	0.90	.96797	26.4	.42131	158.8	.98433	11.9	1 57 52.70
.268	.26518	0.90	.96790	26.5	.42292	158.2	.98421	11.9	1 51 18.97
.269	.26612	0.90	.96784	26.6	.42450	157.5	.98409	12.0	1 54 45.23
0.270	0.26713	0.90	0.96777	26.7	9.42507	156.9	9.98397	12.0	1 58 11.50
.271	.26807	0.90	.96771	26.8	.42704	156.3	.98385	12.1	1 51 37.76
.272	.26900	0.90	.96764	26.9	.42900	155.7	.98373	12.1	1 55 04.03
.273	.27000	0.90	.96757	27.0	.43075	155.1	.98361	12.2	1 58 30.29
.274	.27098	0.90	.96750	27.1	.43240	154.5	.98349	12.2	1 51 56.56
0.275	0.27195	0.90	0.96743	27.2	9.43381	153.9	9.98337	12.3	1 55 22.82
.276	.27281	0.90	.96737	27.3	.43538	153.3	.98324	12.3	1 58 49.09
.277	.27377	0.90	.96730	27.4	.43701	152.8	.98312	12.3	1 52 15.35
.278	.27471	0.90	.96723	27.5	.43844	152.2	.98300	12.4	1 55 41.62
.279	.27563	0.90	.96716	27.6	.43990	151.6	.98287	12.4	1 59 07.88
0.280	0.27660	0.90	0.96709	27.7	9.44117	151.0	9.98275	12.5	1 52 34.15
.281	.27751	0.90	.96702	27.8	.44298	150.5	.98262	12.5	1 56 00.41
.282	.27841	0.90	.96695	27.9	.44448	149.9	.98250	12.6	1 59 26.68
.283	.27931	0.90	.96688	28.0	.44597	149.3	.98237	12.6	1 52 52.94
.284	.28020	0.90	.96681	28.1	.44746	148.8	.98225	12.7	1 56 19.20
0.285	0.28116	0.90	0.96674	28.2	9.44895	148.2	9.98212	12.7	1 59 45.47
.286	.28211	0.90	.96667	28.3	.45043	147.7	.98199	12.8	1 53 11.73
.287	.28304	0.90	.96660	28.4	.45190	147.1	.98187	12.8	1 56 38.00
.288	.28401	0.90	.96653	28.5	.45337	146.6	.98173	12.9	1 50 04.26
.289	.28496	0.90	.96646	28.6	.45481	146.1	.98161	12.9	1 53 30.53
0.290	0.28595	0.90	0.96639	28.7	9.45629	145.5	9.98148	13.0	1 56 56.79
.291	.28691	0.90	.96632	28.8	.45775	145.0	.98135	13.0	1 50 23.06
.292	.28787	0.90	.96625	28.9	.45919	144.5	.98122	13.1	1 53 49.32
.293	.28881	0.90	.96618	29.0	.46064	144.0	.98109	13.1	1 57 15.59
.294	.28978	0.90	.96611	29.1	.46207	143.4	.98095	13.1	1 50 41.85
0.295	0.29074	0.90	0.96604	29.2	9.46350	142.9	9.98082	13.2	1 54 08.12
.296	.29170	0.90	.96597	29.3	.46493	142.4	.98069	13.2	1 57 34.38
.297	.29266	0.90	.96590	29.4	.46635	141.9	.98056	13.3	1 51 00.65
.298	.29361	0.90	.96583	29.5	.46777	141.4	.98042	13.3	1 54 26.91
.299	.29456	0.90	.96576	29.6	.46918	140.9	.98029	13.4	1 57 53.18
0.300	0.29553	0.90	0.96569	29.7	9.47059	140.4	9.98016	13.4	1 51 19.44
$u$	$-\frac{1}{2} \sinh u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\log \frac{\sinh u}{u}$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.300	0.29552	95.5	0.95531	29.6	9.47050	1.444	0.038010	1.34	" " "
.301	.29648	95.5	.95501	29.6	.47105	1.399	.038002	1.35	17 11 19.44
.302	.29743	95.5	.95471	29.7	.47159	1.394	.037995	1.35	17 14 46.71
.303	.29838	95.4	.95441	29.8	.47213	1.389	.037987	1.35	17 18 11.07
.304	.29934	95.4	.95411	29.9	.47268	1.384	.037980	1.35	17 21 38.24
									17 25 04.50
0.305	0.30029	95.4	0.95385	30.0	0.47323	1.379	0.037973	1.35	
.305	.30125	95.4	.95355	30.1	.47377	1.375	.037965	1.35	17 28 30.77
.307	.30220	95.3	.95324	30.2	.47432	1.370	.037958	1.35	17 31 57.03
.308	.30315	95.3	.95294	30.3	.47486	1.365	.037950	1.35	17 35 23.30
.309	.30411	95.3	.95264	30.4	.47541	1.360	.037943	1.35	17 38 49.56
									17 42 15.83
0.310	0.30505	95.2	0.95233	30.5	0.47595	1.355	0.037935	1.35	
.311	.30601	95.2	.95203	30.6	.47650	1.351	.037928	1.35	17 45 42.09
.312	.30695	95.2	.95172	30.7	.47704	1.347	.037920	1.35	17 49 08.35
.313	.30791	95.1	.95141	30.8	.47759	1.342	.037913	1.35	17 52 34.62
.314	.30887	95.1	.95111	30.9	.47813	1.337	.037905	1.35	17 56 00.88
									17 59 27.15
0.315	0.30982	95.1	0.95080	31.0	0.47868	1.333	0.037898	1.35	
.316	.31077	95.0	.95049	31.1	.47922	1.328	.037890	1.35	18 02 53.41
.317	.31172	95.0	.95017	31.2	.47977	1.324	.037883	1.35	18 06 19.68
.318	.31267	95.0	.94986	31.3	.48031	1.319	.037875	1.35	18 09 45.94
.319	.31362	95.0	.94955	31.4	.48086	1.315	.037868	1.35	18 13 12.21
									18 16 38.47
0.320	0.31457	94.9	0.94924	31.5	0.48140	1.311	0.037860	1.35	
.321	.31552	94.9	.94892	31.6	.48195	1.306	.037853	1.35	18 20 04.74
.322	.31646	94.9	.94861	31.6	.48249	1.302	.037845	1.35	18 23 31.00
.323	.31741	94.8	.94829	31.7	.48304	1.297	.037838	1.35	18 26 57.27
.324	.31836	94.8	.94797	31.8	.48358	1.293	.037830	1.35	18 30 23.53
									18 33 49.80
0.325	0.31931	94.8	0.94765	31.9	0.48413	1.289	0.037823	1.35	
.326	.32026	94.7	.94733	32.0	.48467	1.285	.037815	1.35	18 37 16.06
.327	.32120	94.7	.94701	32.1	.48522	1.280	.037808	1.35	18 40 42.33
.328	.32215	94.7	.94669	32.2	.48576	1.276	.037800	1.35	18 44 08.59
.329	.32310	94.6	.94637	32.3	.48631	1.272	.037793	1.35	18 47 34.85
									18 51 01.12
0.330	0.32404	94.6	0.94604	32.4	0.48685	1.268	0.037785	1.35	
.331	.32499	94.6	.94572	32.5	.48740	1.264	.037778	1.35	18 54 27.39
.332	.32593	94.5	.94540	32.6	.48794	1.260	.037770	1.35	18 57 53.65
.333	.32688	94.5	.94507	32.7	.48849	1.256	.037763	1.35	19 01 19.92
.334	.32782	94.5	.94474	32.8	.48903	1.252	.037755	1.35	19 04 46.18
									19 08 12.45
0.335	0.32877	94.4	0.94441	32.9	0.48958	1.248	0.037748	1.35	
.336	.32971	94.4	.94408	33.0	.49012	1.244	.037740	1.35	19 11 38.71
.337	.33066	94.4	.94375	33.1	.49067	1.240	.037733	1.35	19 15 04.97
.338	.33160	94.3	.94342	33.2	.49121	1.236	.037725	1.35	19 18 31.24
.339	.33254	94.3	.94309	33.3	.49176	1.232	.037718	1.35	19 21 57.50
									19 25 23.77
0.340	0.33349	94.3	0.94275	33.3	0.49230	1.228	0.037710	1.35	
.341	.33443	94.2	.94242	33.4	.49285	1.224	.037703	1.35	19 28 50.03
.342	.33537	94.2	.94209	33.5	.49339	1.220	.037695	1.35	19 32 16.30
.343	.33631	94.2	.94175	33.6	.49394	1.216	.037688	1.35	19 35 42.56
.344	.33725	94.1	.94141	33.7	.49448	1.212	.037680	1.35	19 39 08.83
									19 42 35.09
0.345	0.33820	94.1	0.94108	33.8	0.49503	1.208	0.037673	1.35	
.346	.33914	94.1	.94074	33.9	.49557	1.205	.037665	1.35	19 46 01.36
.347	.34008	94.0	.94040	34.0	.49612	1.201	.037658	1.35	19 49 27.62
.348	.34102	94.0	.94006	34.1	.49666	1.197	.037650	1.35	19 52 53.89
.349	.34195	94.0	.93972	34.2	.49721	1.193	.037643	1.35	19 56 20.15
									19 59 46.42
0.350	0.34290	93.9	0.93937	34.3	0.49775	1.190	0.037635	1.35	
									20 03 12.68
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\infty F_0'$	$\cos u$	$\infty F_0'$	$\log \sin u$	$\infty F_0'$	$\log \cos u$	$\infty F_0'$	$u$
0.350	0.34200	0.340	0.93937	34.3	9.53516	119.0	9.97284	15.9	20 03 12.68
.351	.34284	0.340	.93903	34.4	.53035	118.6	.97268	15.9	20 03 38.95
.352	.34378	0.340	.93869	34.5	.52554	118.2	.97252	16.0	20 10 05.21
.353	.34471	0.340	.93834	34.6	.52072	117.9	.97236	16.0	20 13 31.48
.354	.34565	0.340	.93799	34.7	.51589	117.5	.97220	16.1	20 16 57.74
0.355	0.34799	0.348	0.93765	34.8	9.54107	117.2	9.97204	16.1	20 20 24.01
.356	.34853	0.347	.93730	34.9	.51224	116.8	.97188	16.1	20 23 50.27
.357	.34946	0.347	.93695	34.9	.51340	116.4	.97172	16.2	20 27 16.54
.358	.35040	0.347	.93660	35.0	.51457	116.1	.97155	16.2	20 30 42.80
.359	.35134	0.346	.93625	35.1	.51573	115.7	.97139	16.3	20 34 09.07
0.360	0.35427	0.346	0.93590	35.2	9.54688	115.4	9.97123	16.3	20 37 35.33
.361	.35531	0.346	.93554	35.3	.51803	115.0	.97106	16.4	20 41 01.60
.362	.35615	0.345	.93519	35.4	.51918	114.7	.97090	16.4	20 44 27.85
.363	.35708	0.345	.93484	35.5	.52033	114.3	.97074	16.5	20 47 54.12
.364	.35801	0.344	.93448	35.6	.52147	114.0	.97057	16.5	20 51 20.39
0.365	0.35995	0.344	0.93412	35.7	9.55261	113.7	9.97040	16.6	20 54 46.65
.366	.36088	0.344	.93377	35.8	.52371	113.3	.97024	16.6	20 58 12.92
.367	.36182	0.343	.93341	35.9	.52487	113.0	.97007	16.7	21 01 39.18
.368	.36275	0.343	.93305	36.0	.52600	112.6	.96990	16.7	21 05 05.45
.369	.36368	0.343	.93269	36.1	.52713	112.3	.96974	16.8	21 08 31.71
0.370	0.36662	0.342	0.93233	36.2	9.55825	112.0	9.96957	16.8	21 11 57.98
.371	.36755	0.342	.93197	36.3	.52937	111.6	.96940	16.9	21 15 24.24
.372	.36848	0.342	.93160	36.3	.53048	111.3	.96923	16.9	21 18 50.51
.373	.36941	0.341	.93124	36.4	.53159	111.0	.96906	17.0	21 22 16.77
.374	.37034	0.341	.93087	36.5	.53270	110.7	.96889	17.0	21 25 43.04
0.375	0.37327	0.341	0.93051	36.6	9.56380	110.3	9.96872	17.1	21 29 09.30
.376	.37420	0.340	.93014	36.7	.53491	110.0	.96855	17.1	21 32 35.57
.377	.37513	0.340	.92977	36.8	.53600	109.7	.96838	17.2	21 36 01.83
.378	.37606	0.340	.92940	36.9	.53710	109.4	.96820	17.2	21 39 28.10
.379	.37699	0.340	.92904	37.0	.53819	109.0	.96803	17.3	21 42 54.36
0.380	0.37992	0.340	0.92867	37.1	9.56928	108.7	9.96786	17.3	21 46 20.63
.381	.38085	0.340	.92830	37.2	.53937	108.4	.96769	17.4	21 49 46.89
.382	.38178	0.340	.92792	37.3	.54045	108.1	.96751	17.4	21 53 13.16
.383	.38270	0.340	.92755	37.4	.54153	107.8	.96734	17.5	21 56 39.42
.384	.38363	0.340	.92717	37.5	.54261	107.5	.96716	17.5	22 00 05.69
0.385	0.38656	0.347	0.92680	37.6	9.57168	107.2	9.96699	17.6	22 03 31.95
.386	.38749	0.346	.92642	37.6	.54375	106.9	.96681	17.6	22 06 58.22
.387	.38841	0.346	.92605	37.7	.54482	106.6	.96663	17.7	22 10 24.48
.388	.38934	0.346	.92567	37.8	.54588	106.3	.96646	17.8	22 13 50.74
.389	.39026	0.345	.92529	37.9	.54694	106.0	.96628	17.8	22 17 17.01
0.390	0.39319	0.345	0.92491	38.0	9.58200	105.7	9.96610	17.9	22 20 43.27
.391	.39411	0.345	.92453	38.1	.54805	105.4	.96592	17.9	22 24 09.54
.392	.39504	0.344	.92415	38.2	.54911	105.1	.96574	18.0	22 27 35.80
.393	.39596	0.344	.92376	38.3	.55016	104.8	.96556	18.0	22 31 02.07
.394	.39688	0.343	.92338	38.4	.55120	104.5	.96538	18.1	22 34 28.33
0.395	0.39981	0.343	0.92300	38.5	9.58524	104.2	9.96520	18.1	22 37 54.60
.396	.40073	0.343	.92261	38.6	.55228	103.9	.96502	18.2	22 41 20.86
.397	.40165	0.342	.92223	38.7	.55332	103.6	.96484	18.2	22 44 47.13
.398	.40258	0.342	.92185	38.8	.55436	103.3	.96466	18.3	22 48 13.39
.399	.40350	0.341	.92147	38.8	.55539	103.0	.96447	18.3	22 51 39.66
0.400	0.40642	0.341	0.92109	38.9	9.59043	102.7	9.96429	18.4	22 55 05.92
$u$	$-\log \sinh u$	$\infty F_0'$	$\cosh u$	$\infty F_0'$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$u$



## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.400	0.38942	93.1	0.92105	38.9	9.59045	100.7	0.00120	18.4	22.55 65.92
0.401	0.39034	93.1	0.92087	39.0	9.59144	102.1	0.00110	18.4	22.53 33.19
0.402	0.39125	93.0	0.92023	39.1	9.59247	103.5	0.00102	18.5	23.01 58.45
0.403	0.39218	92.9	0.91985	39.2	9.59349	104.9	0.00174	18.5	23.05 34.72
0.404	0.39310	91.9	0.91950	39.3	9.59450	106.3	0.00355	18.6	23.03 50.98
0.405	0.39402	91.9	0.91910	39.4	9.59552	107.7	0.00430	18.6	23.14 17.25
0.406	0.39494	91.9	0.91871	39.5	9.59653	109.0	0.00503	18.7	23.15 43.51
0.407	0.39585	91.8	0.91831	39.6	9.59754	109.7	0.00599	18.7	23.19 09.78
0.408	0.39677	91.8	0.91792	39.7	9.59854	109.5	0.00680	18.4	23.22 36.04
0.409	0.39769	91.8	0.91752	39.8	9.59955	109.2	0.00763	18.3	23.26 02.31
0.410	0.39861	91.7	0.91712	39.9	9.60055	92.9	0.00843	18.2	23.30 38.57
0.411	0.39953	91.7	0.91672	40.0	9.60155	93.0	0.00924	18.0	23.32 54.84
0.412	0.40044	91.5	0.91632	40.0	9.60254	96.1	0.00993	19.0	23.34 21.10
0.413	0.40135	91.6	0.91592	40.1	9.60353	99.1	0.01080	19.0	23.39 47.36
0.414	0.40227	91.6	0.91552	40.2	9.60452	98.3	0.01067	19.1	23.43 13.63
0.415	0.40319	91.5	0.91512	40.3	9.60551	98.6	0.01148	19.1	23.45 30.89
0.416	0.40410	91.5	0.91471	40.4	9.60651	98.3	0.01238	19.2	23.50 06.16
0.417	0.40502	91.4	0.91431	40.5	9.60748	98.0	0.01309	19.2	23.53 32.42
0.418	0.40593	91.4	0.91390	40.6	9.60845	97.8	0.00800	19.3	23.56 58.68
0.419	0.40685	91.3	0.91350	40.7	9.60943	97.5	0.00971	19.3	24.00 24.95
0.420	0.40776	91.3	0.91309	40.8	9.61041	97.3	0.00951	19.4	24.03 51.22
0.421	0.40867	91.3	0.91268	40.9	9.61138	97.0	0.00944	19.4	24.07 17.48
0.422	0.40959	91.2	0.91227	41.0	9.61234	96.7	0.00912	19.5	24.10 43.75
0.423	0.41050	91.2	0.91185	41.0	9.61331	96.5	0.00923	19.6	24.14 10.01
0.424	0.41141	91.1	0.91145	41.1	9.61427	96.2	0.00973	19.6	24.17 0.38
0.425	0.41232	91.1	0.91104	41.2	9.61524	96.0	0.00954	19.7	24.21 05.54
0.426	0.41323	91.1	0.91063	41.3	9.61619	95.7	0.00934	19.7	24.24 31.81
0.427	0.41414	91.0	0.91021	41.4	9.61715	95.5	0.00914	19.8	24.27 58.07
0.428	0.41505	91.0	0.90980	41.5	9.61810	95.3	0.00884	19.8	24.31 24.34
0.429	0.41595	90.9	0.90938	41.6	9.61905	95.0	0.00875	19.9	24.34 50.60
0.430	0.41687	90.9	0.90897	41.7	9.62000	94.7	0.00855	19.9	24.38 16.87
0.431	0.41778	90.9	0.90855	41.8	9.62095	94.4	0.00835	20.0	24.41 43.13
0.432	0.41868	90.8	0.90813	41.9	9.62190	94.2	0.00815	20.0	24.45 09.40
0.433	0.41959	90.8	0.90771	42.0	9.62284	94.0	0.00795	20.1	24.48 35.66
0.434	0.42050	90.7	0.90729	42.1	9.62377	93.7	0.00775	20.1	24.51 51.93
0.435	0.42141	90.7	0.90687	42.2	9.62471	93.5	0.00755	20.2	24.55 18.19
0.436	0.42232	90.6	0.90645	42.3	9.62564	93.2	0.00734	20.2	24.58 44.46
0.437	0.42323	90.6	0.90603	42.4	9.62657	93.0	0.00714	20.3	24.62 10.72
0.438	0.42413	90.6	0.90560	42.5	9.62750	92.8	0.00694	20.3	24.65 36.99
0.439	0.42503	90.5	0.90518	42.5	9.62842	92.5	0.00673	20.4	24.69 03.25
0.440	0.42594	90.5	0.90475	42.6	9.62935	92.3	0.00653	20.4	24.72 29.51
0.441	0.42684	90.4	0.90433	42.7	9.63027	92.0	0.00632	20.5	24.76 05.78
0.442	0.42775	90.4	0.90390	42.8	9.63119	91.8	0.00612	20.6	24.79 32.04
0.443	0.42865	90.3	0.90347	42.9	9.63210	91.5	0.00591	20.6	24.83 08.31
0.444	0.42956	90.3	0.90304	43.0	9.63302	91.3	0.00571	20.7	24.87 34.57
0.445	0.43046	90.3	0.90261	43.0	9.63393	91.1	0.00550	20.7	24.90 60.84
0.446	0.43136	90.2	0.90218	43.1	9.63484	90.8	0.00529	20.8	24.94 37.10
0.447	0.43226	90.2	0.90175	43.2	9.63575	90.5	0.00509	20.8	24.98 13.37
0.448	0.43316	90.1	0.90132	43.3	9.63665	90.3	0.00488	20.9	25.01 39.64
0.449	0.43406	90.1	0.90088	43.4	9.63755	90.1	0.00467	20.9	25.05 15.90
0.450	0.43497	90.0	0.90045	43.5	9.63845	89.9	0.00446	21.0	25.08 42.16
$u$	$-\sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0^2$	$\cos u$	$\omega F_0^1$	$\log \sin u$	$\omega F_0^1$	$\log \cos u$	$\omega F_0^1$	$u$
0.450	0.43492	80.0	0.90015	43.5	9.63845	80.9	9.95446	21.0	25 46 59.16
.451	.43587	80.0	.89991	43.6	.63935	80.7	.95445	21.0	25 50 25.43
.452	.43672	80.0	.89958	43.7	.64025	80.4	.95441	21.1	25 53 51.09
.453	.43766	80.0	.89911	43.8	.64114	80.2	.95383	21.1	25 57 17.06
.454	.43856	80.0	.89870	43.9	.64203	80.0	.95361	21.2	26 00 44.22
0.455	0.43946	80.8	0.89826	43.9	0.64292	88.8	9.95340	21.2	26 04 10.49
.456	.44036	80.8	.89782	44.0	.64381	88.5	.95319	21.3	26 07 36.75
.457	.44126	80.7	.89738	44.1	.64469	88.3	.95298	21.4	26 11 03.02
.458	.44216	80.7	.89691	44.2	.64557	88.1	.95275	21.4	26 14 29.28
.459	.44305	80.6	.89650	44.3	.64645	87.9	.95255	21.5	26 17 55.55
0.460	0.44395	80.6	0.89605	44.4	9.64733	87.7	9.95233	21.5	26 21 21.81
.461	.44484	80.6	.89561	44.5	.64821	87.4	.95212	21.6	26 24 48.08
.462	.44574	80.5	.89516	44.6	.64908	87.2	.95190	21.6	26 28 14.34
.463	.44663	80.5	.89472	44.7	.64995	87.0	.95169	21.7	26 31 40.61
.464	.44753	80.4	.89427	44.8	.65082	85.8	.95147	21.7	26 35 06.87
0.465	0.44842	80.4	0.89382	44.8	9.65169	85.6	9.95125	21.8	26 38 33.13
.466	.44932	80.3	.89337	44.9	.65255	86.4	.95103	21.8	26 41 59.40
.467	.45021	80.3	.89292	45.0	.65341	85.1	.95081	21.9	26 45 25.66
.468	.45110	80.2	.89247	45.1	.65428	85.0	.95059	22.0	26 48 51.93
.469	.45199	80.2	.89202	45.2	.65513	85.7	.95037	22.0	26 52 18.19
0.470	0.45289	80.2	0.89157	45.3	9.65599	85.5	9.95015	22.1	26 55 44.46
.471	.45378	80.1	.89111	45.4	.65681	85.3	.94993	22.1	26 59 10.72
.472	.45467	80.1	.89066	45.5	.65769	85.1	.94971	22.2	27 02 36.99
.473	.45556	80.0	.89021	45.6	.65854	84.9	.94949	22.2	27 05 03.25
.474	.45645	80.0	.88975	45.6	.65939	84.7	.94927	22.3	27 09 29.52
0.475	0.45734	80.0	0.88930	45.7	9.66024	84.4	9.94904	22.3	27 12 55.78
.476	.45823	80.0	.88883	45.8	.66108	84.2	.94882	22.4	27 16 22.05
.477	.45912	80.0	.88838	45.9	.66192	84.0	.94860	22.4	27 19 48.31
.478	.46001	80.0	.88794	46.0	.66276	83.8	.94837	22.5	27 23 14.58
.479	.46089	80.0	.88746	46.1	.66360	83.6	.94815	22.6	27 26 40.84
0.480	0.46178	80.7	0.88700	46.2	9.66443	83.4	9.94792	22.6	27 30 07.11
.481	.46267	80.7	.88653	46.3	.66527	83.2	.94770	22.7	27 33 33.37
.482	.46355	80.6	.88607	46.4	.66610	83.0	.94747	22.7	27 36 59.64
.483	.46444	80.6	.88561	46.4	.66693	82.8	.94724	22.8	27 40 25.90
.484	.46533	80.5	.88514	46.5	.66775	82.6	.94701	22.8	27 43 52.17
0.485	0.46621	80.5	0.88467	46.6	9.66858	82.4	9.94678	22.9	27 47 18.43
.486	.46710	80.4	.88421	46.7	.66940	82.2	.94655	22.9	27 50 44.70
.487	.46798	80.4	.88374	46.8	.67022	82.0	.94633	23.0	27 54 10.96
.488	.46887	80.3	.88327	46.9	.67104	81.8	.94610	23.1	27 57 37.23
.489	.46974	80.3	.88280	47.0	.67185	81.6	.94586	23.1	28 01 03.49
0.490	0.47063	80.2	0.88233	47.1	9.67268	81.4	9.94563	23.2	28 04 29.76
.491	.47151	80.2	.88185	47.2	.67349	81.2	.94540	23.2	28 07 56.02
.492	.47239	80.1	.88139	47.2	.67430	81.0	.94517	23.3	28 11 22.28
.493	.47327	80.1	.88092	47.3	.67511	80.8	.94493	23.3	28 14 48.55
.494	.47415	80.0	.88046	47.4	.67592	80.6	.94470	23.4	28 18 14.81
0.495	0.47503	80.0	0.87997	47.5	9.67672	80.5	9.94447	23.4	28 21 41.08
.496	.47591	80.0	.87950	47.6	.67753	80.3	.94423	23.5	28 25 07.34
.497	.47679	80.0	.87903	47.7	.67833	80.1	.94400	23.6	28 28 33.61
.498	.47767	80.0	.87855	47.8	.67913	79.9	.94376	23.6	28 31 59.87
.499	.47855	80.0	.87806	47.9	.67993	79.7	.94352	23.7	28 35 26.14
0.500	0.47943	80.8	0.87778	47.9	9.68072	79.5	9.94329	23.7	28 38 52.40
$u$	$-\log \sin u$	$\omega F_0^2$	$\cosh u$	$\omega F_0^1$	$\log \frac{\sinh u}{u}$	$\omega F_0^1$	$\log \cosh u$	$\omega F_0^1$	$u$

## Circular Functions.

u	sin u	$\omega F_u'$	cos u	$\omega F_u''$	log sin u	$\omega F_u'''$	log cos u	$\omega F_u''''$	u
0.500	0.47943	87.8	0.87758	47.0	0.68072	70.5	0.91330	33.7	38° 38' 52.40
.501	.48030	87.7	.87710	48.0	.68152	70.3	.91345	33.8	38 42 48.67
.502	.48118	87.7	.87662	48.1	.68231	70.1	.91361	33.8	38 45 44.93
.503	.48206	87.0	.87614	48.2	.68310	70.0	.91377	33.9	38 49 41.20
.504	.48293	87.6	.87566	48.3	.68389	70.7	.91393	34.0	38 52 37.46
0.505	0.48381	87.5	0.87517	48.4	0.68467	70.6	0.91409	34.0	38 56 03.73
.506	.48468	87.5	.87469	48.5	.68546	70.4	.91425	34.1	38 59 39.99
.507	.48556	87.4	.87421	48.6	.68624	70.3	.91441	34.1	39 02 56.26
.508	.48643	87.4	.87372	48.6	.68702	70.0	.91457	34.2	39 06 22.52
.509	.48730	87.3	.87323	48.7	.68780	70.8	.91473	34.2	39 09 48.79
0.510	0.48818	87.3	0.87274	48.8	0.68858	70.6	0.91489	34.3	39 13 15.05
.511	.48905	87.2	.87226	48.9	.68935	70.5	.91504	34.3	39 16 41.32
.512	.48992	87.2	.87177	49.0	.69013	70.3	.91520	34.4	39 20 07.58
.513	.49079	87.1	.87128	49.1	.69090	70.1	.91536	34.5	39 23 33.85
.514	.49166	87.1	.87079	49.2	.69167	70.0	.91551	34.5	39 27 00.11
0.515	0.49253	87.0	0.87029	49.3	0.69244	70.7	0.91567	34.6	39 30 26.38
.516	.49340	87.0	.86980	49.3	.69320	70.6	.91582	34.6	39 33 52.64
.517	.49427	86.9	.86931	49.4	.69397	70.4	.91597	34.7	39 37 18.90
.518	.49514	86.9	.86882	49.5	.69473	70.2	.91613	34.8	39 40 45.17
.519	.49601	86.8	.86833	49.6	.69549	70.0	.91628	34.8	39 44 11.43
0.520	0.49688	86.8	0.86782	49.7	0.69625	70.0	0.91643	34.9	39 47 37.70
.521	.49775	86.7	.86732	49.8	.69701	70.7	.91658	34.9	39 51 03.96
.522	.49861	86.7	.86683	49.9	.69777	70.5	.91673	35.0	39 54 30.23
.523	.49948	86.6	.86633	49.9	.69852	70.3	.91688	35.0	39 57 56.49
.524	.50035	86.6	.86582	50.0	.69927	70.2	.91703	35.1	40 01 22.76
0.525	0.50121	86.5	0.86532	50.1	0.70002	70.0	0.91718	35.1	40 04 49.03
.526	.50208	86.5	.86482	50.2	.70077	70.8	.91733	35.2	40 08 15.29
.527	.50294	86.4	.86432	50.3	.70152	70.6	.91748	35.3	40 11 41.55
.528	.50381	86.4	.86382	50.4	.70226	70.5	.91763	35.3	40 15 07.81
.529	.50467	86.3	.86331	50.5	.70301	70.3	.91778	35.4	40 18 34.08
0.530	0.50553	86.3	0.86281	50.6	0.70375	70.1	0.91793	35.4	40 22 00.35
.531	.50640	86.2	.86230	50.6	.70449	70.0	.91808	35.5	40 25 26.61
.532	.50726	86.2	.86179	50.7	.70523	70.8	.91823	35.6	40 28 52.88
.533	.50812	86.1	.86129	50.8	.70597	70.6	.91838	35.6	40 32 19.14
.534	.50898	86.1	.86078	50.9	.70670	70.4	.91853	35.7	40 35 45.41
0.535	0.50984	86.0	0.86027	51.0	0.70743	70.3	0.91868	35.7	40 39 11.67
.536	.51070	86.0	.85976	51.1	.70817	70.1	.91883	35.8	40 42 37.94
.537	.51156	85.9	.85925	51.2	.70890	70.0	.91898	35.9	40 46 04.20
.538	.51242	85.9	.85874	51.3	.70963	70.8	.91913	35.9	40 49 30.47
.539	.51328	85.8	.85822	51.3	.71035	70.6	.91928	36.0	40 52 56.73
0.540	0.51414	85.8	0.85771	51.4	0.71108	70.5	0.91943	36.0	40 56 23.00
.541	.51499	85.7	.85719	51.5	.71180	70.3	.91958	36.1	40 59 49.26
.542	.51585	85.7	.85668	51.6	.71252	70.1	.91973	36.2	41 03 15.52
.543	.51671	85.6	.85616	51.7	.71324	70.0	.91988	36.2	41 06 41.79
.544	.51756	85.6	.85565	51.8	.71395	70.8	.91999	36.3	41 10 08.05
0.545	0.51842	85.5	0.85513	51.8	0.71468	70.6	0.92014	36.3	41 13 34.32
.546	.51927	85.5	.85461	51.9	.71540	70.5	.92029	36.4	41 17 00.58
.547	.52013	85.4	.85409	52.0	.71611	70.3	.92044	36.4	41 20 26.85
.548	.52098	85.4	.85357	52.1	.71682	70.2	.92059	36.5	41 23 53.11
.549	.52183	85.3	.85305	52.2	.71753	70.0	.92074	36.6	41 27 19.38
0.550	0.52269	85.3	0.85252	52.3	0.71824	70.8	0.92089	36.6	41 30 45.64
<hr/>									
	sinh u	$\omega F_u'$	cosh u	$\omega F_u''$	log sinh u	$\omega F_u'''$	log cosh u	$\omega F_u''''$	u

ABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.550	0.52269	85.3	0.85252	52.3	9.71824	70.8	9.93071	26.6	31° 30' 45.64
.551	.52354	85.2	.85200	52.4	.71805	70.7	.93044	26.7	31 31 11.91
.552	.52439	85.1	.85148	52.4	.71906	70.5	.93017	26.7	31 37 38.17
.553	.52524	85.1	.85095	52.5	.72036	70.4	.92991	26.8	31 41 04.41
.554	.52609	85.0	.85043	52.6	.72166	70.2	.92964	26.9	31 44 30.70
0.555	0.52694	85.0	0.84990	52.7	9.72176	70.0	9.92937	26.9	31 47 56.97
.556	.52779	84.9	.84937	52.8	.72246	69.9	.92910	27.0	31 51 23.23
.557	.52864	84.9	.84884	52.9	.72316	69.7	.92883	27.0	31 54 49.50
.558	.52949	84.8	.84832	52.9	.72386	69.6	.92856	27.1	31 58 15.76
.559	.53034	84.8	.84779	53.0	.72455	69.4	.92829	27.2	32 01 42.03
0.560	0.53119	84.7	0.84726	53.1	9.72525	69.3	9.92801	27.2	32 05 08.29
.561	.53203	84.7	.84672	53.2	.72594	69.1	.92774	27.3	32 08 34.56
.562	.53288	84.6	.84619	53.3	.72663	69.0	.92747	27.3	32 12 00.82
.563	.53373	84.6	.84566	53.4	.72732	68.8	.92719	27.4	32 15 27.09
.564	.53457	84.5	.84512	53.5	.72801	68.7	.92692	27.5	32 18 53.35
0.565	0.53542	84.5	0.84459	53.5	9.72869	68.5	9.92665	27.5	32 22 19.62
.566	.53626	84.4	.84405	53.6	.72938	68.4	.92637	27.6	32 25 45.88
.567	.53710	84.4	.84352	53.7	.73006	68.2	.92609	27.7	32 29 12.15
.568	.53795	84.3	.84298	53.8	.73074	68.1	.92582	27.7	32 32 38.41
.569	.53879	84.2	.84244	53.9	.73142	67.9	.92554	27.8	32 36 04.67
0.570	0.53964	84.2	0.84190	54.0	9.73210	67.8	9.92526	27.8	32 39 30.91
.571	.54047	84.1	.84136	54.0	.73277	67.6	.92498	27.9	32 42 57.20
.572	.54131	84.1	.84082	54.1	.73345	67.5	.92470	28.0	32 46 23.47
.573	.54216	84.0	.84028	54.2	.73412	67.3	.92442	28.0	32 49 49.73
.574	.54300	84.0	.83974	54.3	.73480	67.2	.92414	28.1	32 53 16.00
0.575	0.54383	84.0	0.83919	54.4	9.73547	67.0	9.92386	28.1	32 56 42.26
.576	.54467	83.9	.83865	54.5	.73614	66.9	.92358	28.2	33 00 08.53
.577	.54551	83.8	.83810	54.6	.73680	66.7	.92330	28.3	33 03 34.79
.578	.54635	83.8	.83756	54.6	.73747	66.6	.92301	28.3	33 07 01.06
.579	.54719	83.7	.83701	54.7	.73814	66.4	.92273	28.4	33 10 27.32
0.580	0.54802	83.6	0.83646	54.8	9.73880	66.3	9.92245	28.5	33 13 53.59
.581	.54886	83.6	.83591	54.9	.73946	66.2	.92216	28.5	33 17 19.85
.582	.54970	83.5	.83536	55.0	.74012	66.0	.92188	28.6	33 20 46.12
.583	.55053	83.5	.83481	55.1	.74078	65.9	.92159	28.6	33 24 12.38
.584	.55137	83.4	.83426	55.1	.74144	65.7	.92130	28.7	33 27 38.65
0.585	0.55220	83.4	0.83371	55.2	9.74210	65.6	9.92102	28.8	33 31 04.91
.586	.55303	83.3	.83316	55.3	.74275	65.4	.92073	28.8	33 34 31.18
.587	.55387	83.3	.83261	55.4	.74340	65.3	.92044	28.9	33 37 57.44
.588	.55470	83.2	.83205	55.5	.74405	65.1	.92015	29.0	33 41 23.71
.589	.55553	83.1	.83150	55.6	.74471	65.0	.91986	29.0	33 44 49.97
0.590	0.55636	83.1	0.83094	55.6	9.74536	64.9	9.91957	29.1	33 48 16.24
.591	.55719	83.0	.83038	55.7	.74600	64.7	.91928	29.1	33 51 42.50
.592	.55802	83.0	.82983	55.8	.74665	64.6	.91899	29.2	33 55 08.77
.593	.55885	82.9	.82927	55.9	.74730	64.4	.91869	29.3	33 58 35.03
.594	.55968	82.9	.82871	56.0	.74794	64.3	.91840	29.3	34 02 01.29
0.595	0.56051	82.8	0.82815	56.1	9.74858	64.2	9.91811	29.4	34 05 27.56
.596	.56134	82.8	.82759	56.1	.74922	64.0	.91781	29.5	34 08 53.82
.597	.56216	82.7	.82703	56.2	.74986	63.9	.91752	29.5	34 12 20.09
.598	.56299	82.6	.82646	56.3	.75050	63.8	.91722	29.6	34 15 46.35
.599	.56382	82.6	.82590	56.4	.75114	63.6	.91693	29.6	34 19 12.62
0.600	0.56464	82.5	0.82534	56.5	9.75177	63.5	9.91663	29.7	34 22 38.88
$u$	$-\frac{1}{2} \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$\theta$	$\sin \theta$	$\omega F_{\theta}$	$\cos \theta$	$\omega F_{\theta}$	$\log \sin \theta$	$\omega F_{\theta}$	$\log \cos \theta$	$\omega F_{\theta}$	$\theta$
0.000	0.56161	82.5	0.82534	56.5	0.75077	0.55	0.00173	29.7	31 22 38.88
.001	.56547	82.5	.82477	56.5	.75241	0.53	.00153	29.8	31 23 05.15
.002	.56930	82.4	.82420	56.6	.75301	0.52	.00131	29.8	31 23 31.41
.003	.56912	82.4	.82364	56.7	.75360	0.51	.00117	29.9	31 23 57.68
.004	.56994	82.3	.82307	56.8	.75419	0.50	.00104	30.0	31 24 23.94
0.005	0.56826	82.3	0.82250	56.9	0.75493	0.53	0.00154	29.9	31 24 50.21
.006	.56958	82.2	.82193	57.0	.75556	0.52	.00134	30.0	31 25 16.47
.007	.57041	82.1	.82136	57.0	.75618	0.53	.00151	29.8	31 25 42.74
.008	.57123	82.1	.82079	57.1	.75681	0.54	.00163	29.8	31 26 09.00
.009	.57205	82.0	.82022	57.2	.75743	0.53	.00174	29.8	31 26 35.27
0.010	0.57287	82.0	0.81965	57.3	0.75805	0.54	0.00193	29.4	31 27 01.53
.011	.57369	81.9	.81907	57.4	.75867	0.53	.00173	29.4	31 27 27.80
.012	.57451	81.9	.81850	57.5	.75929	0.49	.00150	29.5	31 27 54.05
.013	.57533	81.8	.81793	57.5	.75991	0.47	.00127	29.5	31 28 20.33
.014	.57614	81.7	.81735	57.6	.76053	0.46	.00111	29.6	31 28 46.59
0.015	0.57696	81.7	0.81677	57.7	0.76114	0.45	0.00100	29.7	31 29 12.86
.016	.57778	81.6	.81620	57.8	.76176	0.44	.00119	29.7	31 29 39.12
.017	.57860	81.6	.81562	57.9	.76237	0.43	.00119	29.8	31 29 65.39
.018	.57941	81.5	.81504	57.9	.76298	0.41	.00113	29.9	31 29 91.65
.019	.58022	81.4	.81446	58.0	.76359	0.40	.00132	29.9	31 29 17.92
0.020	0.58104	81.4	0.81388	58.1	0.76420	0.38	0.00150	31.0	31 29 44.18
.021	.58185	81.3	.81330	58.2	.76481	0.37	.00165	31.1	31 30 10.44
.022	.58266	81.3	.81271	58.3	.76542	0.36	.00180	31.1	31 30 36.71
.023	.58347	81.2	.81213	58.3	.76603	0.34	.00193	31.2	31 31 02.97
.024	.58429	81.2	.81155	58.4	.76664	0.33	.00211	31.3	31 31 29.24
0.025	0.58510	81.1	0.81097	58.5	0.76725	0.32	0.00230	31.3	31 31 55.50
.026	.58591	81.0	.81038	58.6	.76786	0.31	.00249	31.4	31 32 21.77
.027	.58672	81.0	.80979	58.7	.76847	0.29	.00267	31.5	31 32 48.03
.028	.58753	80.9	.80920	58.8	.76908	0.28	.00286	31.6	31 33 14.30
.029	.58834	80.9	.80861	58.8	.76969	0.27	.00304	31.6	31 33 40.56
0.030	0.58914	80.8	0.80803	58.9	0.77030	0.26	0.00323	31.7	31 34 06.83
.031	.58995	80.7	.80744	59.0	.77091	0.24	.00341	31.7	31 34 33.10
.032	.59076	80.7	.80685	59.1	.77151	0.23	.00359	31.8	31 34 59.36
.033	.59157	80.6	.80626	59.2	.77212	0.22	.00377	31.9	31 35 25.62
.034	.59237	80.6	.80566	59.3	.77273	0.21	.00395	31.9	31 35 51.89
0.035	0.59318	80.5	0.80507	59.3	0.77334	0.20	0.00413	32.0	31 36 18.15
.036	.59398	80.4	.80448	59.4	.77395	0.19	.00431	32.1	31 36 44.42
.037	.59479	80.4	.80388	59.5	.77456	0.17	.00449	32.1	31 37 10.68
.038	.59559	80.3	.80329	59.6	.77517	0.16	.00467	32.2	31 37 36.95
.039	.59639	80.3	.80269	59.6	.77578	0.15	.00485	32.3	31 38 03.21
0.040	0.59720	80.2	0.80210	59.7	0.77639	0.14	0.00503	32.3	31 38 29.48
.041	.59800	80.1	.80150	59.8	.77699	0.13	.00521	32.4	31 38 55.74
.042	.59880	80.1	.80090	59.9	.77759	0.12	.00539	32.5	31 39 22.01
.043	.59960	80.0	.80030	60.0	.77819	0.11	.00557	32.5	31 39 48.27
.044	.60040	80.0	.79970	60.0	.77879	0.10	.00575	32.6	31 40 14.54
0.045	0.60120	79.9	0.79910	60.1	0.77939	0.09	0.00593	32.7	31 40 40.80
.046	.60200	79.8	.79850	60.2	.77999	0.08	.00611	32.7	31 41 07.07
.047	.60280	79.8	.79790	60.3	.78059	0.07	.00629	32.8	31 41 33.33
.048	.60360	79.7	.79730	60.4	.78119	0.06	.00647	32.9	31 41 59.59
.049	.60439	79.7	.79669	60.4	.78179	0.05	.00665	32.9	31 42 25.86
0.050	0.60519	79.6	0.79608	60.5	0.78239	0.04	0.00683	33.0	31 42 52.12
$u$	$-\log \sin u$	$\omega F_u$	$\cosh u$	$\omega F_u$	$\log \sinh u$	$\omega F_u$	$\log \cosh u$	$\omega F_u$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\infty F_1'$	$\cos u$	$\infty F_0'$	$\log \sin u$	$\infty F_1'$	$\log \cos u$	$\infty F_0'$	$u$
0.650	0.60519	79.6	0.79608	60.5	9.78189	57.1	9.90096	33.0	$u'$ 37 11 32.12
.651	.60598	79.5	.79543	60.6	.78216	57.0	.90063	33.1	37 17 58.39
.652	.60678	79.5	.79487	60.7	.78303	56.9	.90030	33.2	37 21 21.65
.653	.60757	79.4	.79436	60.8	.78360	56.8	.89997	33.2	37 24 50.92
.654	.60837	79.4	.79386	60.8	.78416	56.7	.89963	33.3	37 28 17.18
0.655	0.60916	79.3	0.79395	60.9	9.78473	56.5	9.89930	33.4	37 31 43.45
.656	.60995	79.2	.79241	61.0	.78540	56.4	.89897	33.4	37 35 09.71
.657	.61074	79.2	.79183	61.1	.78585	56.3	.89853	33.5	37 38 35.98
.658	.61154	79.1	.79122	61.2	.78612	56.2	.89830	33.6	37 42 02.24
.659	.61233	79.1	.79060	61.2	.78698	56.1	.89796	33.6	37 45 28.51
0.660	0.61312	79.0	0.78999	61.3	9.78754	56.0	9.89762	33.7	37 48 54.77
.661	.61391	78.9	.78938	61.4	.78810	55.8	.89729	33.8	37 52 21.04
.662	.61470	78.9	.78876	61.5	.78865	55.7	.89695	33.8	37 55 47.30
.663	.61548	78.8	.78815	61.5	.78922	55.6	.89661	33.9	37 59 13.57
.664	.61627	78.8	.78753	61.6	.78977	55.5	.89627	34.0	38 02 39.83
0.665	0.61706	78.7	0.78692	61.7	9.79033	55.4	9.89593	34.1	38 06 06.10
.666	.61785	78.6	.78630	61.8	.79088	55.3	.89559	34.1	38 09 32.36
.667	.61863	78.6	.78568	61.9	.79143	55.2	.89525	34.2	38 12 58.63
.668	.61942	78.5	.78506	61.9	.79198	55.0	.89490	34.3	38 16 24.89
.669	.62020	78.4	.78444	62.0	.79253	54.9	.89456	34.3	38 19 51.16
0.670	0.62099	78.4	0.78382	62.1	9.79308	54.8	9.89422	34.4	38 23 17.42
.671	.62177	78.3	.78320	62.2	.79363	54.7	.89387	34.5	38 26 43.68
.672	.62255	78.3	.78258	62.3	.79418	54.6	.89353	34.5	38 30 09.95
.673	.62333	78.2	.78196	62.3	.79472	54.5	.89318	34.6	38 33 36.21
.674	.62412	78.1	.78133	62.4	.79527	54.4	.89284	34.7	38 37 02.48
0.675	0.62490	78.1	0.78071	62.5	9.79581	54.3	9.89249	34.8	38 40 28.74
.676	.62568	78.0	.78008	62.6	.79635	54.1	.89214	34.8	38 43 55.01
.677	.62646	77.9	.77946	62.6	.79689	54.0	.89179	34.9	38 47 21.27
.678	.62724	77.9	.77883	62.7	.79743	53.9	.89144	35.0	38 50 47.54
.679	.62802	77.8	.77820	62.8	.79797	53.8	.89109	35.0	38 54 13.80
0.680	0.62879	77.8	0.77757	62.9	9.79851	53.7	9.89074	35.1	38 57 40.07
.681	.62957	77.7	.77694	63.0	.79904	53.6	.89039	35.2	39 01 06.33
.682	.63035	77.6	.77631	63.0	.79958	53.5	.89001	35.3	39 04 32.60
.683	.63113	77.6	.77568	63.1	.80011	53.4	.88968	35.3	39 07 58.86
.684	.63190	77.5	.77505	63.2	.80065	53.3	.88933	35.4	39 11 25.13
0.685	0.63267	77.4	0.77442	63.3	9.80118	53.2	9.88898	35.5	39 14 51.39
.686	.63345	77.4	.77379	63.3	.80171	53.1	.88862	35.6	39 18 17.66
.687	.63423	77.3	.77315	63.4	.80224	52.9	.88826	35.6	39 21 43.92
.688	.63500	77.3	.77252	63.5	.80277	52.8	.88791	35.7	39 25 10.19
.689	.63577	77.2	.77188	63.6	.80330	52.7	.88755	35.8	39 28 36.45
0.690	0.63654	77.1	0.77125	63.7	9.80382	52.6	9.88719	35.8	39 32 02.72
.691	.63731	77.1	.77061	63.7	.80435	52.5	.88683	35.9	39 35 28.98
.692	.63808	77.0	.76997	63.8	.80487	52.4	.88647	36.0	39 38 55.25
.693	.63885	76.9	.76933	63.9	.80540	52.3	.88611	36.1	39 42 21.51
.694	.63962	76.9	.76869	64.0	.80592	52.2	.88575	36.1	39 45 47.78
0.695	0.64039	76.8	0.76805	64.0	9.80644	52.1	9.88539	36.2	39 49 14.04
.696	.64115	76.7	.76741	64.1	.80696	52.0	.88503	36.3	39 52 40.31
.697	.64192	76.7	.76677	64.2	.80748	51.9	.88467	36.4	39 56 06.57
.698	.64269	76.6	.76613	64.3	.80800	51.8	.88430	36.4	39 59 32.83
.699	.64345	76.5	.76549	64.3	.80852	51.7	.88394	36.5	40 02 59.10
0.700	0.64422	76.5	0.76484	64.4	9.80903	51.6	9.88357	36.6	40 06 25.36
$u$	$-\log \sin u$	$\infty F_0'$	$\cosh u$	$\infty F_0'$	$\log \frac{\sinh u}{u}$	$\infty F_1'$	$\log \cosh u$	$\infty F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$	$\sec u$	$\csc u$	$\log \sin u$	$\log \cos u$	$\log \tan u$	$\log \cot u$	$\log \sec u$	$\log \csc u$
0.700	0.64422	70.5	0.70481	61.4	0.80003	51.6	0.88452	34.0	0.00000	0.00000	0.00000	0.00000
0.701	0.64498	70.4	0.70420	61.5	0.80055	51.5	0.88431	34.0	0.00000	0.00000	0.00000	0.00000
0.702	0.64575	70.3	0.70355	61.6	0.80106	51.4	0.88410	34.0	0.00000	0.00000	0.00000	0.00000
0.703	0.64651	70.3	0.70291	61.7	0.80157	51.3	0.88389	34.0	0.00000	0.00000	0.00000	0.00000
0.704	0.64727	70.2	0.70226	61.7	0.81000	51.1	0.88368	34.0	0.00000	0.00000	0.00000	0.00000
0.705	0.64803	70.2	0.70161	61.8	0.81160	51.0	0.88347	34.0	0.00000	0.00000	0.00000	0.00000
0.706	0.64880	70.1	0.70096	61.9	0.81211	50.9	0.88326	34.0	0.00000	0.00000	0.00000	0.00000
0.707	0.64956	70.0	0.70031	65.0	0.81262	50.8	0.88305	34.0	0.00000	0.00000	0.00000	0.00000
0.708	0.65032	70.0	0.75903	65.0	0.81313	50.7	0.88284	34.0	0.00000	0.00000	0.00000	0.00000
0.709	0.65108	75.0	0.75901	65.1	0.81364	50.6	0.88263	34.0	0.00000	0.00000	0.00000	0.00000
0.710	0.65183	75.8	0.75836	65.2	0.81414	50.5	0.88242	34.0	0.00000	0.00000	0.00000	0.00000
0.711	0.65259	75.8	0.75771	65.3	0.81464	50.4	0.88221	34.0	0.00000	0.00000	0.00000	0.00000
0.712	0.65335	75.7	0.75706	65.3	0.81515	50.3	0.88200	34.0	0.00000	0.00000	0.00000	0.00000
0.713	0.65411	75.6	0.75640	65.4	0.81566	50.2	0.88179	34.0	0.00000	0.00000	0.00000	0.00000
0.714	0.65486	75.6	0.75575	65.5	0.81617	50.1	0.88158	34.0	0.00000	0.00000	0.00000	0.00000
0.715	0.65562	75.5	0.75509	65.6	0.81668	50.0	0.88137	34.0	0.00000	0.00000	0.00000	0.00000
0.716	0.65637	75.4	0.75444	65.6	0.81719	49.9	0.88116	34.0	0.00000	0.00000	0.00000	0.00000
0.717	0.65713	75.4	0.75378	65.7	0.81770	49.8	0.88095	34.0	0.00000	0.00000	0.00000	0.00000
0.718	0.65788	75.3	0.75313	65.8	0.81821	49.7	0.88074	34.0	0.00000	0.00000	0.00000	0.00000
0.719	0.65863	75.2	0.75248	65.9	0.81872	49.6	0.88053	34.0	0.00000	0.00000	0.00000	0.00000
0.720	0.65938	75.2	0.75183	65.9	0.81923	49.5	0.88032	34.0	0.00000	0.00000	0.00000	0.00000
0.721	0.66014	75.1	0.75118	66.0	0.81974	49.4	0.88011	34.0	0.00000	0.00000	0.00000	0.00000
0.722	0.66089	75.0	0.75053	66.1	0.82025	49.3	0.87990	34.0	0.00000	0.00000	0.00000	0.00000
0.723	0.66164	75.0	0.74988	66.2	0.82076	49.2	0.87969	34.0	0.00000	0.00000	0.00000	0.00000
0.724	0.66239	74.9	0.74923	66.3	0.82127	49.1	0.87948	34.0	0.00000	0.00000	0.00000	0.00000
0.725	0.66314	74.8	0.74858	66.3	0.82178	49.0	0.87927	34.0	0.00000	0.00000	0.00000	0.00000
0.726	0.66388	74.8	0.74793	66.4	0.82229	48.9	0.87906	34.0	0.00000	0.00000	0.00000	0.00000
0.727	0.66463	74.7	0.74728	66.5	0.82280	48.8	0.87885	34.0	0.00000	0.00000	0.00000	0.00000
0.728	0.66538	74.7	0.74663	66.5	0.82331	48.7	0.87864	34.0	0.00000	0.00000	0.00000	0.00000
0.729	0.66613	74.6	0.74598	66.6	0.82382	48.6	0.87843	34.0	0.00000	0.00000	0.00000	0.00000
0.730	0.66687	74.5	0.74533	66.7	0.82433	48.5	0.87822	34.0	0.00000	0.00000	0.00000	0.00000
0.731	0.66762	74.5	0.74468	66.8	0.82484	48.4	0.87801	34.0	0.00000	0.00000	0.00000	0.00000
0.732	0.66836	74.4	0.74403	66.8	0.82535	48.3	0.87780	34.0	0.00000	0.00000	0.00000	0.00000
0.733	0.66910	74.3	0.74338	66.9	0.82586	48.2	0.87759	34.0	0.00000	0.00000	0.00000	0.00000
0.734	0.66984	74.3	0.74273	67.0	0.82637	48.1	0.87738	34.0	0.00000	0.00000	0.00000	0.00000
0.735	0.67059	74.2	0.74208	67.1	0.82688	48.0	0.87717	34.0	0.00000	0.00000	0.00000	0.00000
0.736	0.67133	74.1	0.74143	67.1	0.82739	47.9	0.87696	34.0	0.00000	0.00000	0.00000	0.00000
0.737	0.67207	74.0	0.74078	67.2	0.82790	47.8	0.87675	34.0	0.00000	0.00000	0.00000	0.00000
0.738	0.67281	74.0	0.73993	67.3	0.82841	47.7	0.87654	34.0	0.00000	0.00000	0.00000	0.00000
0.739	0.67355	73.9	0.73918	67.4	0.82892	47.6	0.87633	34.0	0.00000	0.00000	0.00000	0.00000
0.740	0.67429	73.8	0.73843	67.4	0.82943	47.5	0.87612	34.0	0.00000	0.00000	0.00000	0.00000
0.741	0.67503	73.8	0.73778	67.5	0.82994	47.4	0.87591	34.0	0.00000	0.00000	0.00000	0.00000
0.742	0.67577	73.7	0.73713	67.6	0.83045	47.3	0.87570	34.0	0.00000	0.00000	0.00000	0.00000
0.743	0.67650	73.6	0.73648	67.7	0.83096	47.2	0.87549	34.0	0.00000	0.00000	0.00000	0.00000
0.744	0.67724	73.6	0.73573	67.7	0.83147	47.1	0.87528	34.0	0.00000	0.00000	0.00000	0.00000
0.745	0.67797	73.5	0.73508	67.8	0.83198	47.0	0.87507	34.0	0.00000	0.00000	0.00000	0.00000
0.746	0.67871	73.4	0.73443	67.9	0.83249	46.9	0.87486	34.0	0.00000	0.00000	0.00000	0.00000
0.747	0.67944	73.4	0.73378	67.9	0.83300	46.8	0.87465	34.0	0.00000	0.00000	0.00000	0.00000
0.748	0.68017	73.3	0.73303	68.0	0.83351	46.7	0.87444	34.0	0.00000	0.00000	0.00000	0.00000
0.749	0.68091	73.2	0.73237	68.1	0.83402	46.6	0.87423	34.0	0.00000	0.00000	0.00000	0.00000
0.750	0.68164	73.2	0.73162	68.2	0.83453	46.5	0.87402	34.0	0.00000	0.00000	0.00000	0.00000
0.751	0.68238	73.1	0.73097	68.3	0.83504	46.4	0.87381	34.0	0.00000	0.00000	0.00000	0.00000
0.752	0.68311	73.0	0.73032	68.4	0.83555	46.3	0.87360	34.0	0.00000	0.00000	0.00000	0.00000
0.753	0.68385	72.9	0.72967	68.5	0.83606	46.2	0.87339	34.0	0.00000	0.00000	0.00000	0.00000
0.754	0.68458	72.8	0.72902	68.6	0.83657	46.1	0.87318	34.0	0.00000	0.00000	0.00000	0.00000
0.755	0.68532	72.7	0.72837	68.7	0.83708	46.0	0.87297	34.0	0.00000	0.00000	0.00000	0.00000
0.756	0.68605	72.6	0.72772	68.8	0.83759	45.9	0.87276	34.0	0.00000	0.00000	0.00000	0.00000
0.757	0.68679	72.5	0.72707	68.9	0.83810	45.8	0.87255	34.0	0.00000	0.00000	0.00000	0.00000
0.758	0.68752	72.4	0.72642	69.0	0.83861	45.7	0.87234	34.0	0.00000	0.00000	0.00000	0.00000
0.759	0.68826	72.3	0.72577	69.1	0.83912	45.6	0.87213	34.0	0.00000	0.00000	0.00000	0.00000
0.760	0.68899	72.2	0.72512	69.2	0.83963	45.5	0.87192	34.0	0.00000	0.00000	0.00000	0.00000
0.761	0.68973	72.1	0.72447	69.3	0.84014	45.4	0.87171	34.0	0.00000	0.00000	0.00000	0.00000
0.762	0.69046	72.0	0.72382	69.4	0.84065	45.3	0.87150	34.0	0.00000	0.00000	0.00000	0.00000
0.763	0.69120	71.9	0.72317	69.5	0.84116	45.2	0.87129	34.0	0.00000	0.00000	0.00000	0.00000
0.764	0.69193	71.8	0.72252	69.6	0.84167	45.1	0.87108	34.0	0.00000	0.00000	0.00000	0.00000
0.765	0.69267	71.7	0.72187	69.7	0.84218	45.0	0.87087	34.0	0.00000	0.00000	0.00000	0.00000
0.766	0.69340	71.6	0.72122	69.8	0.84269	44.9	0.87066	34.0	0.00000	0.00000	0.00000	0.00000
0.767	0.69414	71.5	0.72057	69.9	0.84320	44.8	0.87045	34.0	0.00000	0.00000	0.00000	0.00000
0.768	0.69487	71.4	0.71992	70.0	0.84371	44.7	0.87024	34.0	0.00000	0.00000	0.00000	0.00000
0.769	0.69561	71.3	0.71927	70.1	0.84422	44.6	0.87003	34.0	0.00000	0.00000	0.00000	0.00000
0.770	0.69634	71.2	0.71862	70.2	0.84473	44.5	0.86982	34.0	0.00000	0.00000	0.00000	0.00000
0.771	0.69708	71.1	0.71797	70.3	0.84524	44.4	0.86961	34.0	0.00000	0.00000	0.00000	0.00000
0.772	0.69781	71.0	0.71732	70.4	0.84575	44.3	0.86940	34.0	0.00000	0.00000	0.00000	0.00000
0.773	0.69855	70.9	0.71667	70.5	0.84626	44.2	0.86919	34.0	0.00000	0.00000	0.00000	0.00000
0.774	0.69928	70.8	0.71602	70.6	0.84677	44.1	0.86898	34.0	0.00000	0.00000	0.00000	0.00000
0.775	0.69999	70.7	0.71537	70.7	0.84728	44.0	0.86877	34.0	0.00000	0.00000	0.00000	0.00000
0.776	0.70073	70.6	0.71472	70.8	0.84779	43.9	0.86856	34.0	0.00000	0.00000	0.00000	0.00000
0.777	0.70146	70.5	0.71407	70.9	0.84830	43.8	0.86835	34.0	0.00000	0.00000	0.00000	0.00000
0.778	0.70219	70.4	0.71342	71.0	0.84881	43.7	0.86814	34.0	0.00000	0.00000	0.00000	0.00000
0.779	0.70292	70.3	0.71277	71.1	0.84932	43.6	0.86793	34.0	0.00000	0.00000	0.00000	0.00000
0.780	0.70365	70.2	0.71212	71.2	0.84983	43.5	0.86772	34.0	0.00000	0.00000	0.00000	0.00000
0.781	0.70438	70.1	0.71147	71.3	0.85034	43.4	0.86751	34.0	0.00000	0.00000	0.00000	0.00000
0.782	0.70511	70.0	0.71082	71.4	0.85085	43.3	0.86730	34.0	0.00000			

## Circular Functions.

u	sin u	$\omega F_0'$	cos u	$\omega F_0'$	log sin u	$\omega F_0'$	log cos u	$\omega F_0'$	u
0.750	0.68164	73.2	0.73169	68.2	9.83355	46.6	9.86433	46.8	42 58 08.62
.751	.68237	73.1	.73101	68.2	.83402	46.5	.86392	46.9	43 01 4.87
.752	.68310	73.0	.73032	68.3	.83448	46.4	.86352	47.0	43 05 1.23
.753	.68383	73.0	.72964	68.4	.83495	46.3	.86311	47.1	43 08 37.42
.754	.68456	72.9	.72896	68.5	.83541	46.2	.86270	47.2	43 12 03.62
0.755	0.68529	72.8	0.72827	68.5	9.83587	46.2	9.86229	47.3	43 15 29.83
.756	.68602	72.8	.72759	68.6	.83633	46.1	.86188	47.4	43 18 56.10
.757	.68674	72.7	.72690	68.7	.83679	46.0	.86147	47.5	43 22 22.46
.758	.68747	72.6	.72621	68.7	.83725	45.9	.86106	47.6	43 25 48.72
.759	.68820	72.6	.72552	68.8	.83771	45.8	.86065	47.7	43 29 14.99
0.760	0.68892	72.5	0.72484	68.9	9.83817	45.7	9.86024	47.8	43 32 41.25
.761	.68965	72.4	.72415	69.0	.83863	45.6	.86083	47.9	43 36 07.52
.762	.69037	72.3	.72346	69.0	.83908	45.5	.86041	48.0	43 39 33.78
.763	.69109	72.3	.72277	69.1	.83954	45.4	.86000	48.1	43 43 00.05
.764	.69182	72.2	.72207	69.2	.83999	45.3	.85958	48.2	43 46 26.31
0.765	0.69254	72.1	0.72138	69.3	9.84044	45.2	9.85817	48.3	43 49 52.58
.766	.69326	72.1	.72069	69.3	.84089	45.1	.85775	48.4	43 53 18.84
.767	.69398	72.0	.72000	69.4	.84135	45.1	.85733	48.5	43 56 45.11
.768	.69470	71.9	.71930	69.5	.84180	45.0	.85691	48.6	44 00 11.37
.769	.69542	71.9	.71861	69.5	.84225	44.9	.85649	48.7	44 03 37.64
0.770	0.69614	71.8	0.71791	69.6	9.84269	44.8	9.85607	48.8	44 07 03.90
.771	.69685	71.7	.71721	69.7	.84314	44.7	.85565	48.9	44 10 30.17
.772	.69757	71.7	.71652	69.8	.84359	44.6	.85523	49.0	44 13 56.43
.773	.69829	71.6	.71582	69.8	.84403	44.5	.85480	49.1	44 17 22.70
.774	.69900	71.5	.71512	69.9	.84448	44.4	.85438	49.2	44 20 48.96
0.775	0.69972	71.4	0.71442	70.0	9.84492	44.3	9.85395	49.3	44 24 15.22
.776	.70043	71.4	.71372	70.0	.84536	44.3	.85353	49.4	44 27 41.49
.777	.70114	71.3	.71302	70.1	.84581	44.2	.85310	49.5	44 31 07.75
.778	.70185	71.2	.71232	70.2	.84625	44.1	.85267	49.6	44 34 34.02
.779	.70257	71.2	.71162	70.3	.84669	44.0	.85225	49.7	44 38 00.28
0.780	0.70328	71.1	0.71091	70.3	9.84713	43.9	9.85182	49.8	44 41 26.55
.781	.70399	71.0	.71021	70.4	.84757	43.8	.85139	49.9	44 44 52.81
.782	.70470	71.0	.70951	70.5	.84800	43.7	.85095	50.0	44 48 19.08
.783	.70541	70.9	.70880	70.5	.84844	43.6	.85052	43.2	44 51 45.34
.784	.70612	70.8	.70809	70.6	.84888	43.6	.85009	43.3	44 55 11.61
0.785	0.70683	70.7	0.70739	70.7	9.84931	43.5	9.84966	43.4	44 58 37.87
.786	.70753	70.7	.70668	70.8	.84975	43.4	.84922	43.5	45 02 04.14
.787	.70824	70.6	.70597	70.8	.85018	43.3	.84879	43.6	45 05 30.40
.788	.70894	70.5	.70525	70.9	.85061	43.2	.84835	43.7	45 08 56.67
.789	.70965	70.5	.70456	71.0	.85104	43.1	.84792	43.7	45 12 22.93
0.790	0.71035	70.4	0.70385	71.0	9.85147	43.0	9.84748	43.8	45 15 49.20
.791	.71106	70.3	.70313	71.1	.85190	42.9	.84704	43.9	45 19 15.46
.792	.71176	70.2	.70242	71.2	.85233	42.9	.84660	44.0	45 22 41.73
.793	.71246	70.2	.70171	71.2	.85276	42.8	.84616	44.1	45 26 07.99
.794	.71316	70.1	.70100	71.3	.85319	42.7	.84572	44.2	45 29 34.26
0.795	0.71386	70.0	0.70028	71.4	9.85362	42.6	9.84527	44.3	45 33 00.52
.796	.71456	70.0	.69957	71.5	.85404	42.5	.84483	44.4	45 36 26.79
.797	.71526	69.9	.69885	71.5	.85447	42.4	.84439	44.4	45 39 53.05
.798	.71596	69.8	.69814	71.6	.85489	42.3	.84394	44.5	45 43 19.32
.799	.71666	69.7	.69742	71.7	.85531	42.3	.84350	44.6	45 46 45.58
0.800	0.71736	69.7	0.69671	71.7	9.85573	42.2	9.84305	44.7	45 50 11.84
u	-1 sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	log sinh u	$\omega F_0'$	log cosh u	$\omega F_0'$	u



## Circular Functions.

$u$	$\sin u$	$\omega F_u'$	$\cos u$	$\omega F_u'$	$\log \sin u$	$\omega F_u'$	$\log \cos u$	$\omega F_u'$	$u$
0.800	0.717345	60.7	0.696071	71.7	0.85571	-4.2	0.81305	-4.7	45 50 11.81
.801	.71805	60.6	.69590	71.8	.85516	-4.1	.81300	-4.6	45 53 38.11
.802	.71875	60.5	.69572	71.9	.85553	-4.0	.81215	-4.9	45 57 04.32
.803	.71944	60.5	.69555	71.9	.85700	-4.0	.81170	-4.9	46 00 30.61
.804	.72014	60.4	.69533	72.0	.85742	-4.8	.81125	-4.9	46 04 56.90
0.805	0.72083	60.3	0.69311	72.1	0.85783	-4.8	0.81080	-4.9	46 07 33.17
.805	.72152	60.3	.69239	72.2	.85825	-4.7	.81045	-4.9	46 10 40.43
.807	.72222	60.2	.69167	72.2	.85867	-4.6	.81000	-4.9	46 14 15.70
.808	.72291	60.1	.69095	72.3	.85908	-4.5	.80911	-4.9	46 17 41.96
.809	.72360	60.0	.69022	72.4	.85950	-4.4	.80860	-4.9	46 21 08.23
0.810	0.72429	68.9	0.68950	72.4	0.85991	-4.3	0.80853	-4.9	46 24 34.49
.811	.72498	68.9	.68877	72.5	.86032	-4.3	.80803	-4.9	46 28 00.76
.812	.72568	68.8	.68805	72.5	.86074	-4.2	.80752	-4.9	46 31 27.02
.813	.72635	68.7	.68732	72.6	.86115	-4.1	.80706	-4.9	46 34 53.29
.814	.72704	68.7	.68660	72.7	.86156	-4.0	.80650	-4.9	46 38 19.55
0.815	0.72773	68.6	0.68587	72.8	0.86197	-4.0	0.80644	-4.9	46 41 45.81
.816	.72841	68.5	.68514	72.8	.86238	-4.0	.80593	-4.9	46 45 12.08
.817	.72910	68.4	.68441	72.9	.86278	-4.0	.80542	-4.9	46 48 38.35
.818	.72978	68.4	.68368	73.0	.86319	-4.0	.80491	-4.9	46 52 04.61
.819	.73046	68.3	.68295	73.0	.86360	-4.0	.80440	-4.9	46 55 30.88
0.820	0.73115	68.2	0.68222	73.1	0.86400	-4.0	0.80389	-4.9	46 58 57.14
.821	.73183	68.1	.68149	73.2	.86441	-4.0	.80338	-4.9	47 02 23.41
.822	.73251	68.1	.68075	73.3	.86481	-4.0	.80287	-4.9	47 05 49.67
.823	.73319	68.0	.68002	73.3	.86522	-4.0	.80236	-4.9	47 09 15.94
.824	.73387	67.9	.67929	73.4	.86562	-4.0	.80185	-4.9	47 12 42.20
0.825	0.73455	67.9	0.67856	73.5	0.86602	-4.0	0.80134	-4.9	47 16 08.47
.825	.73523	67.8	.67783	73.5	.86642	-4.0	.80083	-4.9	47 19 34.73
.827	.73590	67.7	.67709	73.6	.86683	-4.0	.80031	-4.9	47 23 00.99
.828	.73658	67.6	.67635	73.7	.86722	-3.9	.80017	-4.9	47 26 27.26
.829	.73726	67.6	.67561	73.7	.86764	-3.9	.80070	-4.9	47 29 53.53
0.830	0.73793	67.5	0.67488	73.8	0.86803	-3.9	0.80022	-4.9	47 33 19.79
.831	.73861	67.4	.67414	73.9	.86844	-3.9	.80075	-4.9	47 36 46.05
.832	.73928	67.3	.67340	73.9	.86884	-3.9	.80027	-4.9	47 40 12.32
.833	.73995	67.3	.67266	74.0	.86925	-3.9	.80079	-4.9	47 43 38.58
.834	.74062	67.2	.67192	74.1	.86965	-3.9	.80031	-4.9	47 47 04.85
0.835	0.74130	67.1	0.67118	74.1	0.86999	-3.9	0.80084	-4.9	47 50 31.11
.835	.74197	67.0	.67044	74.2	.87038	-3.9	.80036	-4.9	47 53 57.38
.837	.74264	67.0	.66969	74.3	.87078	-3.9	.80088	-4.9	47 57 23.64
.838	.74331	66.9	.66895	74.3	.87117	-3.9	.80040	-4.9	48 00 49.91
.839	.74398	66.8	.66821	74.4	.87156	-3.9	.80091	-4.9	48 04 16.17
0.840	0.74464	66.7	0.66746	74.5	0.87195	-3.9	0.80043	-4.9	48 07 42.44
.841	.74531	66.7	.66672	74.5	.87234	-3.8	.80094	-4.9	48 11 08.70
.842	.74598	66.6	.66597	74.6	.87273	-3.8	.80046	-4.9	48 14 34.97
.843	.74664	66.5	.66523	74.7	.87311	-3.8	.80097	-4.9	48 18 01.23
.844	.74731	66.4	.66448	74.7	.87350	-3.8	.80049	-4.9	48 21 27.50
0.845	0.74797	66.4	0.66373	74.8	0.87388	-3.8	0.80001	-4.9	48 24 53.76
.845	.74863	66.3	.66298	74.9	.87427	-3.8	.80052	-4.9	48 28 20.03
.847	.74930	66.2	.66223	74.9	.87465	-3.8	.80004	-4.9	48 31 46.29
.848	.74996	66.1	.66148	75.0	.87504	-3.8	.80055	-4.9	48 35 12.56
.849	.75062	66.1	.66073	75.1	.87542	-3.8	.80006	-4.9	48 38 38.82
0.850	0.75128	66.0	0.65998	75.1	0.87580	-3.8	0.80058	-4.9	48 42 05.09
$u$	$-\sin u$	$\omega F_u'$	$\cosh u$	$\omega F_u'$	$\log \sinh u$	$\omega F_u'$	$\log \cosh u$	$\omega F_u'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.850	0.75128	66.0	0.65908	75.1	9.87580	38.2	9.81953	49.1	48° 42' 05".09
.851	.75194	65.9	.65923	75.2	.87618	38.1	.81904	49.5	48 45 31.35
.852	.75260	65.8	.65848	75.3	.87656	38.0	.81854	49.6	48 48 57.61
.853	.75326	65.8	.65773	75.3	.87694	37.9	.81805	49.7	48 52 23.88
.854	.75391	65.7	.65697	75.4	.87732	37.8	.81755	49.8	48 55 50.14
0.855	0.75457	65.6	0.65622	75.5	9.87770	37.8	9.81705	49.9	48 59 16.41
.856	.75523	65.5	.65546	75.5	.87808	37.7	.81655	50.0	49 02 42.67
.857	.75588	65.5	.65471	75.6	.87845	37.6	.81605	50.1	49 06 08.94
.858	.75654	65.4	.65395	75.7	.87883	37.5	.81555	50.2	49 09 35.20
.859	.75719	65.3	.65319	75.7	.87920	37.5	.81504	50.3	49 13 01.47
0.860	0.75784	65.2	0.65244	75.8	9.87958	37.4	9.81454	50.4	49 16 27.73
.861	.75849	65.2	.65168	75.8	.87995	37.3	.81403	50.5	49 19 54.00
.862	.75915	65.1	.65092	75.9	.88033	37.2	.81353	50.7	49 23 20.26
.863	.75980	65.0	.65016	75.9	.88070	37.2	.81302	50.8	49 26 46.53
.864	.76045	64.9	.64940	76.0	.88107	37.1	.81251	50.9	49 30 12.79
0.865	0.76110	64.9	0.64864	76.1	9.88144	37.0	9.81200	51.0	49 33 39.06
.866	.76174	64.8	.64788	76.2	.88181	36.9	.81149	51.1	49 37 05.32
.867	.76239	64.7	.64712	76.2	.88218	36.9	.81098	51.2	49 40 31.59
.868	.76303	64.6	.64635	76.3	.88255	36.8	.81047	51.3	49 43 57.85
.869	.76368	64.6	.64559	76.4	.88291	36.7	.80995	51.4	49 47 24.12
0.870	0.76433	64.5	0.64483	76.4	9.88328	36.6	9.80944	51.5	49 50 50.38
.871	.76497	64.4	.64406	76.5	.88365	36.6	.80893	51.6	49 54 16.65
.872	.76562	64.3	.64330	76.6	.88401	36.5	.80841	51.7	49 57 42.91
.873	.76626	64.3	.64253	76.6	.88438	36.4	.80789	51.8	50 01 09.18
.874	.76690	64.2	.64176	76.7	.88474	36.3	.80738	51.9	50 04 35.44
0.875	0.76754	64.1	0.64100	76.8	9.88510	36.3	9.80686	52.0	50 08 01.71
.876	.76818	64.0	.64023	76.8	.88547	36.2	.80634	52.1	50 11 27.97
.877	.76882	63.9	.63946	76.9	.88583	36.1	.80581	52.2	50 14 54.24
.878	.76946	63.9	.63869	76.9	.88619	36.0	.80529	52.3	50 18 20.50
.879	.77010	63.8	.63792	77.0	.88655	36.0	.80477	52.4	50 21 46.76
0.880	0.77074	63.7	0.63715	77.1	9.88691	35.9	9.80424	52.5	50 25 13.03
.881	.77138	63.6	.63638	77.1	.88727	35.8	.80372	52.6	50 28 39.29
.882	.77201	63.6	.63561	77.2	.88762	35.8	.80319	52.7	50 32 05.56
.883	.77265	63.5	.63484	77.3	.88798	35.7	.80266	52.9	50 35 31.82
.884	.77328	63.4	.63406	77.3	.88834	35.6	.80213	53.0	50 38 58.09
0.885	0.77391	63.3	0.63329	77.4	9.88869	35.5	9.80160	53.1	50 42 24.35
.886	.77455	63.3	.63252	77.5	.88905	35.5	.80107	53.2	50 45 50.62
.887	.77518	63.2	.63174	77.5	.88940	35.4	.80054	53.3	50 49 16.88
.888	.77581	63.1	.63096	77.6	.88976	35.3	.80001	53.4	50 52 43.15
.889	.77644	63.0	.63019	77.6	.89011	35.2	.79947	53.5	50 56 09.41
0.890	0.77707	62.9	0.62941	77.7	9.89046	35.2	9.79894	53.6	50 59 35.68
.891	.77770	62.9	.62863	77.8	.89081	35.1	.79840	53.7	51 03 01.94
.892	.77833	62.8	.62785	77.8	.89116	35.0	.79786	53.8	51 06 28.21
.893	.77896	62.7	.62708	77.9	.89151	35.0	.79732	53.9	51 09 54.47
.894	.77958	62.6	.62630	78.0	.89185	34.9	.79678	54.1	51 13 20.74
0.895	0.78021	62.6	0.62552	78.0	9.89221	34.8	9.79624	54.2	51 16 47.00
.896	.78083	62.5	.62474	78.1	.89256	34.7	.79570	54.3	51 20 13.27
.897	.78146	62.4	.62396	78.1	.89291	34.7	.79515	54.4	51 23 39.53
.898	.78208	62.3	.62318	78.2	.89325	34.6	.79461	54.5	51 27 05.80
.899	.78270	62.2	.62239	78.3	.89360	34.5	.79406	54.6	51 30 32.06
0.900	0.78333	62.2	0.62161	78.3	9.89394	34.5	9.79352	54.7	51 33 58.33
$u$	$-1 \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\infty F_0'$	$\cos u$	$\infty F_0'$	$\log \sin u$	$\infty F_0'$	$\log \cos u$	$\infty F_0'$	$\theta$
0.900	0.78333	62.2	0.62161	78.3	9.89394	34.5	9.79352	54.7	51 33 58.33
.901	.78395	62.1	.62083	78.1	.89429	34.1	.79297	54.8	51 37 54.50
.902	.78457	62.0	.62004	78.5	.89463	34.3	.79242	55.0	51 40 50.86
.903	.78519	61.9	.61926	78.5	.89497	34.3	.79187	55.1	51 44 47.12
.904	.78581	61.8	.61847	78.6	.89532	34.2	.79132	55.2	51 47 43.38
0.905	0.78643	61.8	0.61769	78.6	9.89566	34.1	9.79077	55.3	51 51 00.65
.906	.78704	61.7	.61690	78.7	.89600	34.0	.79023	55.4	51 54 35.01
.907	.78766	61.6	.61611	78.8	.89634	34.0	.78968	55.5	51 58 02.38
.908	.78827	61.5	.61532	78.8	.89668	33.9	.78910	55.6	52 01 38.44
.909	.78889	61.5	.61453	78.9	.89702	33.8	.78855	55.8	52 04 54.71
0.910	0.78950	61.4	0.61375	79.0	9.89735	33.8	9.78790	55.0	52 08 20.97
.911	.79012	61.3	.61296	79.0	.89769	33.7	.78743	56.0	52 11 47.24
.912	.79073	61.2	.61217	79.1	.89803	33.6	.78687	56.1	52 15 13.50
.913	.79134	61.1	.61137	79.1	.89836	33.6	.78631	56.2	52 18 39.77
.914	.79195	61.1	.61058	79.2	.89870	33.5	.78574	56.3	52 22 06.03
0.915	0.79256	61.0	0.60979	79.3	9.89903	33.4	9.78518	56.4	52 25 32.30
.916	.79317	60.9	.60900	79.3	.89937	33.3	.78462	56.0	52 28 58.56
.917	.79378	60.8	.60820	79.4	.89970	33.3	.78405	56.7	52 32 24.83
.918	.79439	60.7	.60741	79.4	.90003	33.2	.78348	56.8	52 35 51.09
.919	.79500	60.7	.60662	79.5	.90036	33.1	.78291	56.9	52 39 17.36
0.920	0.79560	60.6	0.60582	79.6	9.90070	33.1	9.78234	57.0	52 42 43.62
.921	.79621	60.5	.60502	79.6	.90103	33.0	.78177	57.2	52 46 09.89
.922	.79681	60.4	.60423	79.7	.90136	33.0	.78120	57.3	52 49 36.15
.923	.79742	60.3	.60343	79.7	.90168	32.9	.78063	57.4	52 53 02.42
.924	.79802	60.3	.60263	79.8	.90201	32.8	.78005	57.5	52 56 28.68
0.925	0.79862	60.2	0.60183	79.9	9.90234	32.7	9.77948	57.6	52 59 54.95
.926	.79922	60.1	.60104	79.9	.90267	32.7	.77890	57.7	53 03 21.21
.927	.79982	60.0	.60024	80.0	.90300	32.6	.77833	57.0	53 06 47.48
.928	.80042	59.9	.59944	80.0	.90332	32.5	.77774	58.0	53 10 13.74
.929	.80102	59.9	.59864	80.1	.90364	32.5	.77716	58.1	53 13 40.01
0.930	0.80162	59.8	0.59783	80.2	9.90397	32.4	9.77658	58.2	53 17 06.27
.931	.80222	59.7	.59703	80.2	.90430	32.3	.77600	58.1	53 20 32.53
.932	.80281	59.6	.59623	80.3	.90461	32.3	.77541	58.5	53 23 58.80
.933	.80341	59.5	.59543	80.3	.90494	32.2	.77483	58.6	53 27 25.06
.934	.80400	59.5	.59462	80.4	.90525	32.1	.77424	58.7	53 30 51.33
0.935	0.80460	59.4	0.59382	80.5	9.90558	32.1	9.77365	58.8	53 34 17.59
.936	.80519	59.3	.59301	80.5	.90590	32.0	.77306	59.0	53 37 43.85
.937	.80579	59.2	.59221	80.6	.90622	31.9	.77247	59.1	53 41 10.12
.938	.80638	59.1	.59140	80.6	.90654	31.9	.77188	59.2	53 44 36.39
.939	.80697	59.1	.59060	80.7	.90686	31.8	.77129	59.3	53 48 02.65
0.940	0.80756	59.0	0.58979	80.8	9.90717	31.7	9.77070	59.5	53 51 28.92
.941	.80815	58.9	.58898	80.8	.90749	31.7	.77010	59.6	53 54 55.18
.942	.80874	58.8	.58817	80.9	.90781	31.6	.76950	59.7	53 58 21.45
.943	.80932	58.7	.58736	80.9	.90812	31.5	.76891	59.8	54 01 47.71
.944	.80991	58.7	.58655	81.0	.90844	31.5	.76831	60.0	54 05 13.98
0.945	0.81050	58.6	0.58574	81.0	9.90875	31.4	9.76771	60.1	54 08 40.24
.946	.81108	58.5	.58493	81.1	.90906	31.3	.76711	60.2	54 12 06.51
.947	.81167	58.4	.58412	81.2	.90938	31.3	.76650	60.3	54 15 32.77
.948	.81225	58.3	.58331	81.2	.90969	31.2	.76590	60.5	54 18 59.04
.949	.81283	58.2	.58250	81.3	.91000	31.1	.76529	60.6	54 22 25.30
0.950	0.81342	58.2	0.58168	81.3	9.91031	31.1	9.76469	60.7	54 25 51.57
$u$	$-\sin u$	$\infty F_0'$	$\cosh u$	$\infty F_0'$	$\log \sinh u$	$\infty F_0'$	$\log \cosh u$	$\infty F_0'$	$u$

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## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
0.950	0.81342	58.2	0.58168	81.3	9.91031	31.1	9.76469	60.7	54° 25' 51.57
.951	.81400	58.1	.58087	81.4	.91062	31.0	.76408	60.9	54 29 17.83
.952	.81458	58.0	.58006	81.5	.91093	30.9	.76347	61.0	54 32 44.10
.953	.81516	57.9	.57924	81.5	.91124	30.9	.76286	61.1	54 36 10.36
.954	.81574	57.8	.57842	81.6	.91155	30.8	.76225	61.2	54 39 36.63
0.955	0.81631	57.8	0.57751	81.6	9.91185	30.7	9.76163	61.4	54 43 02.89
.956	.81689	57.7	.57670	81.7	.91216	30.7	.76102	61.5	54 46 29.15
.957	.81747	57.6	.57597	81.7	.91247	30.6	.76040	61.6	54 49 55.42
.958	.81804	57.5	.57516	81.8	.91278	30.5	.75979	61.8	54 53 21.68
.959	.81862	57.4	.57434	81.9	.91308	30.5	.75917	61.9	54 56 47.95
0.960	0.81919	57.4	0.57352	81.9	9.91339	30.4	9.75855	62.0	55 00 14.21
.961	0.81976	57.3	.57270	82.0	.91369	30.3	.75793	62.2	55 03 40.48
.962	.82034	57.2	.57188	82.0	.91399	30.3	.75731	62.3	55 07 06.74
.963	.82091	57.1	.57105	82.1	.91429	30.2	.75668	62.4	55 10 33.01
.964	.82148	57.0	.57024	82.1	.91460	30.1	.75606	62.6	55 13 59.27
0.965	0.82205	56.9	0.56942	82.2	9.91490	30.1	9.75543	62.7	55 17 25.54
.966	.82262	56.9	.56859	82.3	.91520	30.0	.75480	62.8	55 20 51.80
.967	.82319	55.8	.56777	82.3	.91550	29.9	.75417	63.0	55 24 18.07
.968	.82375	56.7	.56695	82.4	.91580	29.9	.75354	63.1	55 27 44.33
.969	.82432	56.6	.56612	82.4	.91610	29.8	.75291	63.2	55 31 10.60
0.970	0.82489	56.5	0.56530	82.5	9.91639	29.8	9.75228	63.4	55 34 36.86
.971	.82545	56.4	.56447	82.5	.91669	29.7	.75164	63.5	55 38 03.13
.972	.82601	56.4	.56365	82.6	.91699	29.6	.75101	63.6	55 41 29.39
.973	.82658	56.3	.56282	82.7	.91728	29.6	.75037	63.8	55 44 55.66
.974	.82714	56.2	.56200	82.7	.91758	29.5	.74973	63.9	55 48 21.92
0.975	0.82770	56.1	0.56117	82.8	9.91787	29.4	9.74909	64.1	55 51 48.19
.976	.82826	56.0	.56034	82.8	.91817	29.4	.74845	64.2	55 55 14.45
.977	.82882	56.0	.55951	82.9	.91846	29.3	.74781	64.3	55 58 40.72
.978	.82938	55.9	.55868	82.9	.91875	29.2	.74717	64.5	56 02 05.98
.979	.82994	55.8	.55785	83.0	.91905	29.2	.74652	64.6	56 05 33.25
0.980	0.83050	55.7	0.55702	83.0	9.91934	29.1	9.74587	64.8	56 08 59.51
.981	.83105	55.6	.55619	83.1	.91963	29.1	.74522	64.9	56 12 25.77
.982	.83161	55.5	.55536	83.2	.91992	29.0	.74457	65.0	56 15 52.04
.983	.83216	55.5	.55453	83.2	.92021	28.9	.74392	65.2	56 19 18.30
.984	.83272	55.4	.55370	83.3	.92050	28.9	.74327	65.3	56 22 44.57
0.985	0.83327	55.3	0.55285	83.3	9.92079	28.8	9.74262	65.5	56 26 10.83
.986	.83382	55.2	.55203	83.4	.92107	28.8	.74195	65.6	56 29 37.10
.987	.83438	55.1	.55120	83.4	.92135	28.7	.74131	65.7	56 33 03.36
.988	.83493	55.0	.55036	83.5	.92165	28.6	.74065	65.9	56 36 29.63
.989	.83548	55.0	.54953	83.5	.92193	28.6	.73999	66.0	56 39 55.89
0.990	0.83603	54.9	0.54859	83.5	9.92222	28.5	9.73933	66.2	56 43 22.16
.991	.83657	54.8	.54785	83.7	.92250	28.4	.73866	66.3	56 46 48.42
.992	.83712	54.7	.54702	83.7	.92279	28.4	.73800	66.5	56 50 14.69
.993	.83767	54.6	.54618	83.8	.92307	28.3	.73734	66.6	56 53 40.95
.994	.83821	54.5	.54534	83.8	.92335	28.3	.73667	66.8	56 57 07.22
0.995	0.83876	54.5	0.54450	83.9	9.92364	28.2	9.73600	66.9	57 00 33.48
.996	.83930	54.4	.54366	83.9	.92392	28.1	.73533	67.0	57 03 59.75
.997	.83985	54.3	.54282	84.0	.92420	28.1	.73466	67.2	57 07 26.01
.998	.84039	54.2	.54198	84.0	.92448	28.0	.73399	67.3	57 10 52.28
.999	.84093	54.1	.54114	84.1	.92476	27.9	.73331	67.5	57 14 18.54
1.000	0.84147	54.0	0.54030	84.1	9.92504	27.9	9.73264	67.6	57 17 44.81
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
1.000	0.84147	54.0	0.54030	84.1	9.92504	27.9	9.73264	67.6	57° 17' 44.81
.001	.84201	53.9	.53945	84.2	.92532	27.8	.73196	67.8	57 21 11.07
.002	.84255	53.9	.53852	84.3	.92560	27.8	.73128	67.9	57 24 37.34
.003	.84309	53.8	.53778	84.3	.92587	27.7	.73060	68.1	57 28 03.60
.004	.84363	53.7	.53693	84.4	.92615	27.6	.72992	68.2	57 31 29.87
1.005	0.84416	53.6	0.53609	84.4	9.92643	27.6	9.72924	68.4	57 34 56.13
.006	.84470	53.5	.53524	84.5	.92673	27.5	.72855	68.5	57 38 22.40
.007	.84523	53.4	.53440	84.5	.92698	27.5	.72787	68.7	57 41 48.65
.008	.84577	53.4	.53355	84.6	.92725	27.4	.72718	68.8	57 45 14.92
.009	.84630	53.3	.53271	84.6	.92752	27.3	.72649	69.0	57 48 41.19
1.010	0.84683	53.2	0.53186	84.7	9.92780	27.3	9.72580	69.1	57 52 07.45
.011	.84736	53.1	.53101	84.7	.92807	27.2	.72511	69.3	57 55 33.72
.012	.84789	53.0	.53017	84.8	.92834	27.2	.72441	69.5	57 58 59.98
.013	.84842	52.9	.52932	84.8	.92851	27.1	.72372	69.6	58 02 26.25
.014	.84895	52.8	.52847	84.9	.92888	27.0	.72302	69.8	58 05 52.51
1.015	0.84948	52.8	0.52762	85.0	9.92915	27.0	9.72232	69.9	58 09 18.78
.016	.85001	52.7	.52777	85.0	.92942	26.9	.72162	70.1	58 12 45.04
.017	.85053	52.6	.52592	85.1	.92969	26.9	.72092	70.2	58 16 11.31
.018	.85106	52.5	.52507	85.1	.92996	26.8	.72022	70.4	58 19 37.57
.019	.85158	52.4	.52422	85.2	.93023	26.7	.71951	70.6	58 23 03.84
1.020	0.85211	52.3	0.52337	85.2	9.93049	26.7	9.71881	70.7	58 26 30.10
.021	.85263	52.3	.52251	85.3	.93076	26.6	.71810	70.9	58 29 56.37
.022	.85315	52.2	.52166	85.3	.93103	26.6	.71739	71.0	58 33 22.63
.023	.85367	52.1	.52081	85.4	.93129	26.5	.71668	71.2	58 36 48.90
.024	.85419	52.0	.51995	85.4	.93156	26.4	.71596	71.3	58 40 15.16
1.025	0.85471	51.9	0.51910	85.5	9.93182	26.4	9.71525	71.5	58 43 41.43
.026	.85523	51.8	.51824	85.5	.93208	26.3	.71453	71.7	58 47 07.69
.027	.85575	51.7	.51739	85.6	.93235	26.3	.71382	71.8	58 50 33.95
.028	.85627	51.7	.51653	85.6	.93261	26.2	.71310	72.0	58 54 00.22
.029	.85678	51.6	.51568	85.7	.93287	26.1	.71238	72.2	58 57 26.49
1.030	0.85730	51.5	0.51482	85.7	9.93313	26.1	9.71165	72.3	59 00 52.75
.031	.85781	51.4	.51396	85.8	.93339	26.0	.71093	72.5	59 04 19.02
.032	.85833	51.3	.51310	85.8	.93365	26.0	.71020	72.6	59 07 45.28
.033	.85884	51.2	.51224	85.9	.93391	25.9	.70948	72.8	59 11 11.54
.034	.85935	51.1	.51139	85.9	.93417	25.8	.70875	73.0	59 14 37.81
1.035	0.85985	51.1	0.51053	86.0	9.93443	25.8	9.70802	73.1	59 18 04.07
.036	.86037	51.0	.50967	86.0	.93469	25.7	.70729	73.3	59 21 30.34
.037	.86088	50.9	.50881	86.1	.93494	25.7	.70655	73.5	59 24 56.60
.038	.86139	50.8	.50794	86.1	.93520	25.6	.70582	73.6	59 28 22.87
.039	.86190	50.7	.50708	86.2	.93546	25.6	.70508	73.8	59 31 49.13
1.040	0.86240	50.6	0.50622	86.2	9.93571	25.5	9.70434	74.0	59 35 15.40
.041	.86291	50.5	.50536	86.3	.93597	25.4	.70360	74.2	59 38 41.66
.042	.86341	50.4	.50449	86.3	.93622	25.4	.70286	74.3	59 42 07.93
.043	.86392	50.4	.50363	86.4	.93647	25.3	.70211	74.5	59 45 34.19
.044	.86442	50.3	.50277	86.4	.93673	25.3	.70137	74.7	59 49 00.46
1.045	0.86492	50.2	0.50190	86.5	9.93698	25.2	9.70062	74.8	59 52 26.72
.046	.86543	50.1	.50104	86.5	.93723	25.1	.69987	75.0	59 55 52.99
.047	.86593	50.0	.50017	86.6	.93748	25.1	.69912	75.2	59 59 19.25
.048	.86643	49.9	.49930	86.6	.93773	25.0	.69837	75.4	60 02 45.52
.049	.86693	49.8	.49844	86.7	.93798	25.0	.69761	75.5	60 06 11.78
1.050	0.86742	49.8	0.49757	86.7	9.93823	24.9	9.69685	75.7	60 09 38.05
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$\theta$	$\sin \theta$	$\omega F_0'$	$\cos \theta$	$\omega F_0'$	$\log \sin \theta$	$\omega F_0'$	$\log \cos \theta$	$\omega F_0'$	$\theta$
1.050	0.85742	49.8	0.49257	85.7	9.93823	24.9	9.69685	75.7	60° 09' 38.05
.051	.85792	49.7	.49270	85.8	.93848	24.9	.696910	75.9	60 13 04.31
.052	.85842	49.6	.49284	85.8	.93873	24.8	.69534	76.1	60 16 30.58
.053	.85891	49.5	.49297	85.9	.93898	24.7	.69458	76.2	60 19 56.84
.054	.85941	49.4	.49310	85.9	.93922	24.7	.69381	76.4	60 23 23.11
1.055	0.85990	49.3	0.49323	87.0	9.93947	24.6	9.69305	76.6	60 26 49.37
.056	.86040	49.2	.49335	87.0	.93972	24.6	.69228	76.8	60 30 15.61
.057	.86088	49.1	.49349	87.1	.93995	24.5	.69151	77.0	60 33 41.90
.058	.86138	49.1	.49362	87.1	.94021	24.5	.69074	77.1	60 37 08.17
.059	.86187	49.0	.49374	87.2	.94045	24.4	.68997	77.3	60 40 34.43
1.060	0.86236	48.0	0.48887	87.2	9.94069	24.3	9.68920	77.5	60 44 00.69
.061	.86284	48.8	.48899	87.3	.94094	24.3	.68842	77.7	60 47 26.95
.062	.86333	48.7	.48913	87.3	.94118	24.2	.68764	77.9	60 50 53.22
.063	.86382	48.6	.48925	87.4	.94142	24.2	.68686	78.0	60 54 19.49
.064	.86430	48.5	.48938	87.4	.94165	24.1	.68608	78.2	60 57 45.75
1.065	0.86479	48.5	0.48450	87.5	9.94190	24.1	9.68530	78.4	61 01 12.02
.066	.86527	48.4	.48463	87.5	.94214	24.0	.68451	78.6	61 04 38.28
.067	.86576	48.3	.48475	87.6	.94238	23.9	.68373	78.8	61 08 04.55
.068	.86624	48.2	.48488	87.6	.94262	23.9	.68294	79.0	61 11 30.81
.069	.86672	48.1	.48500	87.7	.94285	23.8	.68215	79.2	61 14 57.08
1.070	0.86720	48.0	0.48012	87.7	9.94310	23.8	9.68135	79.3	61 18 23.34
.071	.86768	47.9	.47925	87.8	.94334	23.7	.68056	79.5	61 21 49.61
.072	.86816	47.8	.47937	87.8	.94357	23.7	.67976	79.7	61 25 15.87
.073	.86864	47.7	.47949	87.9	.94381	23.6	.67896	79.9	61 28 42.14
.074	.86911	47.7	.47961	87.9	.94405	23.6	.67816	80.1	61 32 08.40
1.075	0.86959	47.6	0.47573	88.0	9.94428	23.5	9.67736	80.3	61 35 34.67
.076	.87007	47.5	.47485	88.0	.94451	23.4	.67656	80.5	61 39 00.93
.077	.87054	47.4	.47397	88.1	.94475	23.4	.67575	80.7	61 42 27.20
.078	.87101	47.3	.47399	88.1	.94498	23.3	.67494	80.9	61 45 53.46
.079	.87149	47.2	.47221	88.1	.94522	23.3	.67414	81.1	61 49 19.73
1.080	0.87196	47.1	0.47133	88.2	9.94545	23.2	9.67332	81.3	61 52 45.99
.081	.87243	47.0	.47045	88.2	.94568	23.2	.67251	81.5	61 56 12.25
.082	.87290	47.0	.46958	88.3	.94591	23.1	.67169	81.7	61 59 38.52
.083	.87337	46.9	.46870	88.3	.94614	23.0	.67088	81.9	62 03 04.79
.084	.87384	46.8	.46783	88.4	.94637	23.0	.67006	82.1	62 06 31.05
1.085	0.87430	46.7	0.46691	88.4	9.94660	22.9	9.66924	82.3	62 09 57.31
.086	.87477	46.6	.46603	88.5	.94683	22.9	.66841	82.5	62 13 23.58
.087	.87524	46.5	.46514	88.5	.94706	22.8	.66759	82.7	62 16 49.84
.088	.87570	46.4	.46426	88.6	.94729	22.8	.66676	82.9	62 20 16.11
.089	.87616	46.3	.46337	88.6	.94751	22.7	.66593	83.1	62 23 42.37
1.090	0.87663	46.2	0.46249	88.7	9.94774	22.7	9.66510	83.3	62 27 08.64
.091	.87709	46.2	.46160	88.7	.94797	22.6	.66426	83.5	62 30 34.90
.092	.87755	46.1	.46071	88.8	.94819	22.5	.66343	83.7	62 34 01.17
.093	.87801	46.0	.45982	88.8	.94842	22.5	.66259	83.9	62 37 27.43
.094	.87847	45.9	.45894	88.8	.94864	22.4	.66175	84.1	62 40 53.70
1.095	0.87893	45.8	0.45805	88.9	9.94887	22.4	9.66091	84.3	62 44 19.96
.096	.87939	45.7	.45716	88.9	.94909	22.3	.66007	84.5	62 47 46.23
.097	.87984	45.6	.45627	89.0	.94931	22.3	.65922	84.7	62 51 12.49
.098	.88030	45.5	.45538	89.0	.94954	22.2	.65837	84.9	62 54 38.76
.099	.88075	45.4	.45449	89.1	.94976	22.2	.65752	85.1	62 58 05.02
1.100	0.88121	45.4	0.45360	89.1	9.94998	22.1	9.65667	85.3	63 01 31.29
$\theta$	$-1 \sinh \theta$	$\omega F_0'$	$\cosh \theta$	$\omega F_0'$	$\log \frac{\sinh \theta}{\theta}$	$\omega F_0'$	$\log \cosh \theta$	$\omega F_0'$	$\theta$

## Circular Functions.

$x$	$\sin x$	$\cos x$	$\tan x$	$\cot x$	$\sec x$	$\csc x$	$\log \sin x$	$\log \cos x$	$\log \tan x$	$\log \cot x$	$\log \sec x$	$\log \csc x$
1.100	0.89121	.454	0.45360	89.1	9.94938	2.21	0.63607	85.3	0.110	31.29		
.101	.89166	.453	.45270	89.2	.95020	2.20	.65386	85.5	0.104	32.55		
.102	.89211	.452	.45181	89.3	.95042	2.20	.65480	85.8	0.108	33.82		
.103	.89256	.451	.45092	89.4	.95061	2.19	.65480	86.0	0.114	35.08		
.104	.89301	.450	.45003	89.5	.95080	2.19	.65424	86.2	0.115	36.35		
1.105	0.89346	.449	0.44913	89.6	9.95168	2.18	0.65238	86.1	0.118	37.61		
.106	.89391	.448	.44824	89.7	.95130	2.18	.65151	86.0	0.122	38.88		
.107	.89436	.447	.44735	89.8	.95151	2.17	.65064	85.8	0.125	40.14		
.108	.89481	.446	.44645	89.9	.95173	2.17	.64977	85.9	0.129	41.41		
.109	.89525	.446	.44556	89.9	.95195	2.16	.64890	85.3	0.131	42.67		
1.110	0.89570	.445	0.44466	89.6	9.95216	2.16	0.64803	85.5	0.135	43.93		
.111	.89614	.444	.44377	89.6	.95238	2.15	.64715	85.7	0.139	45.20		
.112	.89659	.443	.44287	89.7	.95259	2.15	.64628	85.9	0.142	46.46		
.113	.89703	.442	.44197	89.7	.95281	2.14	.64540	85.9	0.146	47.73		
.114	.89747	.441	.44108	89.7	.95302	2.13	.64453	85.1	0.149	48.99		
1.115	0.89791	.440	0.44018	89.8	9.95323	2.13	0.64366	85.0	0.153	50.26		
.116	.89835	.439	.43928	89.8	.95345	2.12	.64278	84.8	0.156	51.52		
.117	.89879	.438	.43838	89.9	.95366	2.12	.64191	84.9	0.160	52.79		
.118	.89923	.437	.43748	89.9	.95387	2.11	.64103	84.3	0.164	54.05		
.119	.89966	.437	.43658	90.0	.95408	2.11	.64007	84.5	0.166	55.32		
1.120	0.90010	.436	0.43568	90.0	9.95429	2.10	0.63919	84.7	0.170	56.58		
.121	.90054	.435	.43478	90.1	.95450	2.10	.63832	84.9	0.174	57.85		
.122	.90097	.434	.43388	90.1	.95471	2.09	.63745	84.9	0.178	59.11		
.123	.90140	.433	.43298	90.1	.95492	2.09	.63658	84.4	0.182	60.38		
.124	.90184	.432	.43208	90.2	.95513	2.08	.63570	84.6	0.186	61.64		
1.125	0.90227	.431	0.43118	90.2	9.95534	2.08	0.63483	84.9	0.190	62.91		
.126	.90270	.430	.43027	90.3	.95555	2.07	.63395	84.1	0.194	64.17		
.127	.90313	.429	.42937	90.3	.95575	2.06	.63308	84.3	0.198	65.44		
.128	.90356	.428	.42847	90.4	.95596	2.06	.63220	84.6	0.202	66.70		
.129	.90399	.428	.42756	90.4	.95616	2.05	.63133	84.8	0.206	67.97		
1.130	0.90441	.427	0.42666	90.4	9.95637	2.05	0.63046	84.1	0.210	69.23		
.131	.90484	.426	.42576	90.5	.95657	2.04	.62958	84.3	0.214	70.50		
.132	.90526	.425	.42485	90.5	.95678	2.04	.62871	84.5	0.218	71.76		
.133	.90569	.424	.42391	90.6	.95698	2.03	.62783	84.8	0.222	73.03		
.134	.90611	.423	.42304	90.6	.95718	2.03	.62696	84.9	0.226	74.29		
1.135	0.90653	.422	0.42213	90.7	9.95738	2.02	0.62608	84.1	0.230	75.56		
.136	.90696	.421	.42123	90.7	.95759	2.02	.62521	84.3	0.234	76.82		
.137	.90738	.420	.42032	90.7	.95779	2.01	.62433	84.5	0.238	78.08		
.138	.90780	.419	.41941	90.8	.95799	2.01	.62346	84.8	0.242	79.35		
.139	.90822	.419	.41850	90.8	.95819	2.00	.62258	84.9	0.246	80.61		
1.140	0.90863	.418	0.41759	90.9	9.95839	2.00	0.62171	84.1	0.250	81.88		
.141	.90905	.417	.41669	90.9	.95859	1.99	.62083	84.3	0.254	83.14		
.142	.90947	.416	.41578	90.9	.95879	1.99	.61996	84.5	0.258	84.41		
.143	.90988	.415	.41487	91.0	.95899	1.98	.61908	84.8	0.262	85.67		
.144	.91030	.414	.41396	91.0	.95918	1.97	.61821	84.9	0.266	86.94		
1.145	0.91071	.413	0.41305	91.1	9.95938	1.97	0.61733	84.1	0.270	88.20		
.146	.91112	.412	.41214	91.1	.95958	1.96	.61646	84.3	0.274	89.47		
.147	.91153	.411	.41122	91.2	.95977	1.96	.61558	84.5	0.278	90.73		
.148	.91195	.410	.41031	91.3	.95997	1.95	.61471	84.8	0.282	92.00		
.149	.91235	.409	.40940	91.3	.96016	1.95	.61383	84.9	0.286	93.26		
1.150	0.91276	.408	0.40849	91.3	9.96036	1.94	0.61296	84.1	0.290	94.53		
$x$	$-\log \sinh x$	$\log \cosh x$	$\log \tanh x$	$\log \coth x$	$\log \sec x$	$\log \csc x$	$\log \sin x$	$\log \cos x$	$\log \tan x$	$\log \cot x$	$\log \sec x$	$\log \csc x$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
1.150	0.91276	40.8	0.40849	91.3	9.96036	19.4	0.61118	97.0	65° 53' 24.53
.151	.91317	40.8	.40757	91.3	.96055	19.4	.61021	97.3	65 56 50.79
.152	.91358	40.7	.40665	91.4	.96075	19.3	.60923	97.6	66 00 17.06
.153	.91399	40.6	.40575	91.4	.96094	19.3	.60825	97.8	66 03 43.32
.154	.91439	40.5	.40483	91.4	.96113	19.2	.60728	98.1	66 07 09.59
1.155	0.91479	40.4	0.40392	91.5	9.96132	19.2	0.60629	98.4	66 10 35.85
.156	.91520	40.3	.40300	91.5	.96152	19.1	.60531	98.6	66 14 02.12
.157	.91560	40.2	.40209	91.6	.96171	19.1	.60432	98.9	66 17 28.38
.158	.91600	40.1	.40117	91.6	.96190	19.0	.60333	99.2	66 20 54.65
.159	.91640	40.0	.40026	91.6	.96209	19.0	.60234	99.4	66 24 20.91
1.160	0.91680	39.9	0.39934	91.7	9.96228	18.9	0.60134	99.7	66 27 47.18
.161	.91720	39.8	.39842	91.7	.96246	18.9	.60034	100.0	66 31 13.44
.162	.91760	39.8	.39751	91.8	.96265	18.8	.59934	100.3	66 34 39.70
.163	.91800	39.7	.39659	91.8	.96284	18.8	.59834	100.5	66 38 05.97
.164	.91839	39.6	.39567	91.8	.96303	18.7	.59733	100.8	66 41 32.23
1.165	0.91879	39.5	0.39475	91.9	9.96322	18.7	0.59632	101.1	66 44 58.50
.166	.91918	39.4	.39383	91.9	.96340	18.6	.59531	101.4	66 48 24.76
.167	.91958	39.3	.39291	92.0	.96359	18.6	.59430	101.6	66 51 51.03
.168	.91997	39.2	.39199	92.0	.96377	18.5	.59328	101.9	66 55 17.29
.169	.92036	39.1	.39107	92.0	.96396	18.5	.59226	102.2	66 58 43.56
1.170	0.92075	39.0	0.39015	92.1	9.96414	18.4	0.59123	102.5	67 02 09.82
.171	.92114	38.9	.38923	92.1	.96433	18.4	.59021	102.8	67 05 36.09
.172	.92153	38.8	.38831	92.2	.96451	18.3	.58918	103.1	67 09 02.35
.173	.92192	38.7	.38739	92.2	.96469	18.2	.58815	103.4	67 12 28.62
.174	.92230	38.6	.38647	92.2	.96487	18.2	.58711	103.6	67 15 54.88
1.175	0.92269	38.6	0.38554	92.3	9.96506	18.1	0.58607	103.9	67 19 21.15
.176	.92307	38.5	.38462	92.3	.96524	18.1	.58503	104.2	67 22 47.41
.177	.92346	38.4	.38370	92.3	.96542	18.0	.58400	104.5	67 26 13.68
.178	.92384	38.3	.38277	92.4	.96560	18.0	.58296	104.8	67 29 39.94
.179	.92422	38.2	.38185	92.4	.96578	17.9	.58192	105.1	67 33 06.21
1.180	0.92461	38.1	0.38092	92.5	9.96596	17.9	0.58088	105.4	67 36 32.47
.181	.92500	38.0	.38000	92.5	.96614	17.8	.57978	105.7	67 39 58.74
.182	.92537	37.9	.37907	92.5	.96631	17.8	.57872	106.0	67 43 25.00
.183	.92574	37.8	.37815	92.6	.96649	17.7	.57766	106.3	67 46 51.27
.184	.92612	37.7	.37722	92.6	.96667	17.7	.57660	106.6	67 50 17.53
1.185	0.92650	37.6	0.37630	92.6	9.96684	17.6	0.57553	106.9	67 53 43.80
.186	.92687	37.5	.37537	92.7	.96702	17.6	.57446	107.2	67 57 10.06
.187	.92725	37.4	.37444	92.7	.96720	17.5	.57339	107.5	68 00 36.33
.188	.92762	37.3	.37352	92.8	.96737	17.5	.57231	107.9	68 04 02.59
.189	.92800	37.3	.37259	92.8	.96755	17.4	.57123	108.2	68 07 28.85
1.190	0.92837	37.2	0.37166	92.8	9.96772	17.4	0.57015	108.5	68 10 55.12
.191	.92874	37.1	.37073	92.9	.96789	17.3	.56906	108.8	68 14 21.38
.192	.92911	37.0	.36980	92.9	.96807	17.3	.56797	109.1	68 17 47.65
.193	.92948	36.9	.36887	92.9	.96824	17.2	.56688	109.4	68 21 13.91
.194	.92985	36.8	.36794	93.0	.96841	17.2	.56578	109.8	68 24 40.18
1.195	0.93022	36.7	0.36701	93.0	9.96858	17.1	0.56468	110.1	68 28 06.44
.196	.93058	36.6	.36608	93.1	.96875	17.1	.56358	110.4	68 31 32.71
.197	.93095	36.5	.36515	93.1	.96893	17.0	.56247	110.7	68 34 58.97
.198	.93131	36.4	.36422	93.1	.96910	17.0	.56137	111.0	68 38 25.24
.199	.93168	36.3	.36329	93.2	.96927	16.9	.56025	111.4	68 41 51.50
1.200	0.93204	36.2	0.36236	93.2	9.96943	16.9	0.55914	111.7	68 45 17.77
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$



## Circular Functions.

$u$	$\sin u$	$\infty F_u'$	$\cos u$	$\infty F_u'$	$\log \sin u$	$\infty F_u'$	$\log \cos u$	$\infty F_u'$	$u$
1.200	0.93201	36.2	0.36236	93.2	9.97013	16.0	9.55004	111.7	68° 45' 17.27
.201	.93140	36.1	.36143	93.2	.97000	16.8	.55802	112.0	68 45 14.03
.202	.93076	36.0	.36049	93.3	.96977	16.8	.55800	112.1	68 52 10.30
.203	.93012	36.0	.35956	93.3	.96954	16.7	.55577	112.2	68 55 30.50
.204	.92948	35.9	.35863	93.3	.96931	16.7	.55401	112.0	68 59 02.83
1.205	0.92881	35.8	0.35769	93.4	0.96907	16.6	0.55331	112.1	69 02 30.09
.206	.92820	35.7	.35676	93.4	.96911	16.6	.55347	112.7	69 05 35.36
.207	.92755	35.6	.35582	93.5	.96900	16.5	.55131	112.1	69 09 21.62
.208	.92691	35.5	.35489	93.5	.96977	16.5	.55000	112.1	69 12 47.89
.209	.92626	35.4	.35395	93.5	.96993	16.4	.54895	112.3	69 16 14.15
1.210	0.92562	35.3	0.35302	93.6	0.96910	16.4	0.54790	112.1	69 19 40.42
.211	.92502	35.2	.35208	93.6	.96936	16.3	.54696	112.5	69 23 05.68
.212	.92432	35.1	.35115	93.6	.96943	16.3	.54599	112.3	69 26 32.05
.213	.92367	35.0	.35021	93.7	.96959	16.2	.54493	112.2	69 29 39.21
.214	.92302	34.9	.34927	93.7	.96975	16.2	.54397	112.5	69 33 45.47
1.215	0.92237	34.8	0.34834	93.7	0.96901	16.1	0.54300	112.9	69 36 51.74
.216	.92172	34.7	.34740	93.8	.96907	16.1	.54183	112.2	69 40 18.00
.217	.92106	34.6	.34646	93.8	.96923	16.0	.54065	112.6	69 43 44.27
.218	.92041	34.6	.34553	93.8	.96939	16.0	.53948	112.9	69 47 10.53
.219	.91975	34.5	.34458	93.9	.96955	15.9	.53830	113.3	69 50 36.80
1.220	0.91910	34.4	0.34365	93.9	0.96971	15.9	0.53711	113.7	69 54 03.06
.221	.91844	34.3	.34271	93.9	.96987	15.8	.53593	113.1	69 57 29.33
.222	.91778	34.2	.34177	94.0	.96993	15.8	.53473	113.4	70 00 55.59
.223	.91713	34.1	.34084	94.0	.96999	15.7	.53353	113.8	70 04 21.84
.224	.91647	34.0	.33989	94.0	.97034	15.7	.53233	120.9	70 07 48.11
1.225	0.91581	33.9	0.33895	94.1	0.97050	15.6	0.53113	120.5	70 11 14.39
.226	.91515	33.8	.33800	94.1	.97066	15.6	.52993	120.9	70 14 40.65
.227	.91448	33.7	.33706	94.1	.97081	15.5	.52871	121.3	70 18 06.92
.228	.91382	33.6	.33612	94.2	.97097	15.5	.52750	121.7	70 21 33.18
.229	.91315	33.5	.33518	94.2	.97112	15.5	.52628	122.1	70 24 59.44
1.230	0.91249	33.4	0.33424	94.2	0.97128	15.4	0.52506	122.5	70 28 25.71
.231	.91182	33.3	.33330	94.3	.97143	15.4	.52383	122.9	70 31 51.98
.232	.91116	33.2	.33235	94.3	.97158	15.3	.52260	123.3	70 35 18.24
.233	.91049	33.1	.33141	94.3	.97174	15.3	.52136	123.6	70 38 44.51
.234	.90982	33.0	.33047	94.4	.97189	15.2	.52013	124.0	70 42 10.77
1.235	0.90915	33.0	0.32952	94.4	0.97204	15.2	0.51889	124.4	70 45 37.04
.236	.90848	32.9	.32858	94.4	.97219	15.1	.51764	124.8	70 49 03.30
.237	.90781	32.8	.32763	94.5	.97234	15.1	.51639	125.2	70 52 29.57
.238	.90713	32.7	.32669	94.5	.97249	15.0	.51513	125.6	70 55 55.83
.239	.90646	32.6	.32574	94.5	.97264	15.0	.51387	126.1	70 59 22.09
1.240	0.90578	32.5	0.32480	94.6	0.97279	14.9	0.51261	126.5	71 02 48.36
.241	.90511	32.4	.32385	94.6	.97294	14.9	.51134	126.9	71 06 14.62
.242	.90443	32.3	.32290	94.6	.97309	14.8	.51007	127.3	71 09 40.89
.243	.90375	32.2	.32195	94.7	.97324	14.8	.50880	127.7	71 13 07.15
.244	.90308	32.1	.32101	94.7	.97338	14.7	.50752	128.1	71 16 33.42
1.245	0.90240	32.0	0.32006	94.7	0.97353	14.7	0.50624	128.6	71 19 59.68
.246	.90172	31.9	.31912	94.8	.97368	14.6	.50495	129.0	71 23 25.95
.247	.90103	31.8	.31817	94.8	.97382	14.6	.50366	129.4	71 26 52.21
.248	.90035	31.7	.31722	94.8	.97397	14.5	.50236	129.8	71 30 18.48
.249	.90067	31.6	.31627	94.9	.97411	14.5	.50106	130.3	71 33 44.74
1.250	0.90000	31.5	0.31532	94.9	0.97426	14.4	0.49975	130.7	71 37 11.01
$u$	$-1 \sin u$	$\infty F_u'$	$\cosh u$	$\infty F_u'$	$\log \sinh u$	$\infty F_u'$	$\log \cosh u$	$\infty F_u'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

u	sin u	$\omega F_0'$	cos u	$\omega F_0'$	log sin u	$\omega F_0'$	log cos u	$\omega F_0'$	u
I. 250	0.94898	31.5	0.31532	94.9	9.97726	14.4	9.49875	130.7	71 37 11.01
.251	.94930	31.4	.31437	94.9	.97740	14.4	.49745	131.1	71 40 37.27
.252	.94961	31.3	.31342	95.0	.97755	14.3	.49613	131.6	71 44 03.51
.253	.94993	31.2	.31247	95.0	.97769	14.3	.49481	132.0	71 47 29.80
.254	.95024	31.2	.31152	95.0	.97783	14.2	.49349	132.5	71 50 56.07
I. 255	0.95055	31.1	0.31057	95.1	9.97797	14.2	9.49216	132.9	71 54 22.33
.256	.95086	31.0	.30962	95.1	.97812	14.1	.49083	133.4	71 57 48.60
.257	.95117	30.9	.30867	95.1	.97826	14.1	.48950	133.8	72 01 14.86
.258	.95148	30.8	.30772	95.1	.97840	14.0	.48816	134.3	72 04 41.13
.259	.95178	30.7	.30677	95.2	.97854	14.0	.48681	134.7	72 08 07.39
I. 260	0.95209	30.6	0.30582	95.2	9.97868	13.9	9.48546	135.2	72 11 33.66
.261	.95240	30.5	.30486	95.2	.97882	13.9	.48411	135.7	72 14 59.92
.262	.95270	30.4	.30391	95.3	.97896	13.9	.48275	136.1	72 18 26.19
.263	.95300	30.3	.30296	95.3	.97909	13.8	.48138	136.6	72 21 52.45
.264	.95331	30.2	.30201	95.3	.97923	13.7	.48002	137.1	72 25 18.72
I. 265	0.95361	30.1	0.30105	95.4	9.97937	13.7	9.47864	137.6	72 28 44.98
.266	.95391	30.0	.30010	95.4	.97951	13.7	.47726	138.0	72 32 11.24
.267	.95421	29.9	.29914	95.4	.97964	13.6	.47588	138.5	72 35 37.51
.268	.95451	29.8	.29819	95.5	.97978	13.6	.47449	139.0	72 39 03.77
.269	.95480	29.7	.29724	95.5	.97991	13.5	.47310	139.5	72 42 30.04
I. 270	0.95510	29.6	0.29628	95.5	9.98005	13.5	9.47170	140.0	72 45 56.30
.271	.95540	29.5	.29533	95.5	.98018	13.4	.47030	140.5	72 49 22.57
.272	.95569	29.4	.29437	95.6	.98032	13.4	.46889	141.0	72 52 48.83
.273	.95599	29.3	.29341	95.6	.98045	13.3	.46748	141.5	72 56 15.10
.274	.95628	29.2	.29246	95.6	.98058	13.3	.46606	142.0	72 59 41.36
I. 275	0.95657	29.2	0.29150	95.7	9.98072	13.2	9.46464	142.5	73 03 07.63
.276	.95686	29.1	.29054	95.7	.98085	13.2	.46321	143.0	73 06 33.89
.277	.95715	29.0	.28959	95.7	.98098	13.1	.46178	143.5	73 10 00.16
.278	.95744	28.9	.28863	95.7	.98111	13.1	.46034	144.1	73 13 26.42
.279	.95773	28.8	.28767	95.8	.98124	13.0	.45890	144.6	73 16 52.69
I. 280	0.95802	28.7	0.28672	95.8	9.98137	13.0	9.45745	145.1	73 20 18.95
.281	.95830	28.6	.28576	95.8	.98150	13.0	.45600	145.6	73 23 45.22
.282	.95859	28.5	.28480	95.9	.98163	12.9	.45454	146.2	73 27 11.48
.283	.95887	28.4	.28384	95.9	.98176	12.9	.45307	146.7	73 30 37.75
.284	.95916	28.3	.28288	95.9	.98189	12.8	.45160	147.3	73 34 04.01
I. 285	0.95944	28.2	0.28192	95.9	9.98202	12.8	9.45013	147.8	73 37 30.28
.286	.95972	28.1	.28096	96.0	.98214	12.7	.44865	148.3	73 40 56.54
.287	.96000	28.0	.28000	96.0	.98227	12.7	.44716	148.9	73 44 22.81
.288	.96028	27.9	.27904	96.0	.98240	12.6	.44567	149.5	73 47 49.07
.289	.96056	27.8	.27808	96.1	.98252	12.6	.44417	150.0	73 51 15.34
I. 290	0.96084	27.7	0.27712	96.1	9.98265	12.5	9.44267	150.6	73 54 41.60
.291	.96111	27.6	.27616	96.1	.98277	12.5	.44116	151.1	73 58 07.86
.292	.96139	27.5	.27520	96.1	.98290	12.4	.43965	151.7	74 01 34.13
.293	.96166	27.4	.27424	96.2	.98302	12.4	.43813	152.3	74 05 00.39
.294	.96194	27.3	.27328	96.2	.98315	12.3	.43660	152.9	74 08 26.66
I. 295	0.96221	27.2	0.27231	96.2	9.98327	12.3	9.43507	153.5	74 11 52.92
.295	.96248	27.1	.27135	96.2	.98339	12.2	.43353	154.0	74 15 19.19
.297	.96275	27.0	.27039	96.3	.98351	12.2	.43199	154.6	74 18 45.45
.298	.96302	26.9	.26943	96.3	.98364	12.2	.43044	155.2	74 22 11.72
.299	.96329	26.8	.26846	96.3	.98376	12.1	.42888	155.8	74 25 37.98
I. 300	0.96356	26.7	0.26750	96.4	9.98388	12.1	9.42732	156.4	74 29 04.25
u	-1 sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	$\log \frac{\sinh u}{1}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	u

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
1.300	0.96356	26.7	0.26750	96.4	9.98388	12.1	9.12733	156.1	" " "
.301	.96383	26.7	.26754	96.4	.98400	12.0	.12525	157.0	74 39 04.25
.302	.96409	26.6	.26757	96.4	.98412	12.0	.12418	157.7	74 32 30.51
.303	.96439	26.5	.26761	96.4	.98424	11.9	.12260	158.3	74 35 50.78
.304	.96462	26.4	.26764	96.5	.98436	11.9	.12102	158.9	74 39 23.04
1.305	0.96488	26.3	0.26768	96.5	9.98447	11.8	9.11042	159.5	74 42 49.31
.306	.96515	26.2	.26771	96.5	.98459	11.8	.11283	160.2	74 46 15.57
.307	.96541	26.1	.26775	96.5	.98471	11.7	.11022	160.8	74 49 41.84
.308	.96567	26.0	.26778	96.6	.98483	11.7	.11161	161.5	74 53 08.10
.309	.96593	25.9	.26782	96.6	.98494	11.6	.11399	162.1	74 56 34.37
1.310	0.96618	25.8	0.26785	96.6	9.98506	11.6	9.11137	162.7	75 00 00.63
.311	.96644	25.7	.26788	96.6	.98518	11.5	.11074	163.4	75 03 26.90
.312	.96670	25.6	.26792	96.7	.98529	11.5	.10810	164.0	75 06 53.16
.313	.96695	25.5	.26795	96.7	.98541	11.5	.10646	164.7	75 10 19.43
.314	.96721	25.4	.26798	96.7	.98552	11.4	.10481	165.1	75 13 45.69
1.315	0.96746	25.3	0.26802	96.7	9.98563	11.4	9.10315	165.7	75 17 11.96
.316	.96771	25.2	.26805	96.8	.98575	11.3	.10148	166.2	75 20 38.22
.317	.96797	25.1	.26808	96.8	.98586	11.3	.10081	166.7	75 24 04.49
.318	.96822	25.0	.26811	96.8	.98597	11.2	.10014	167.4	75 27 30.75
.319	.96847	24.9	.26814	96.8	.98608	11.2	.10045	168.1	75 30 57.01
1.320	0.96872	24.8	0.26818	96.9	9.98620	11.1	9.10076	168.8	75 34 23.28
.321	.96896	24.7	.26821	96.9	.98631	11.1	.10007	169.5	75 37 49.54
.322	.96921	24.6	.26824	96.9	.98642	11.0	.10035	170.2	75 41 15.81
.323	.96946	24.5	.26827	96.9	.98653	11.0	.10064	170.9	75 44 42.07
.324	.96970	24.4	.26830	97.0	.98664	10.9	.10092	171.7	75 48 08.34
1.325	0.96994	24.3	0.26833	97.0	9.98675	10.9	9.10120	172.1	75 51 34.60
.326	.97019	24.2	.26836	97.0	.98686	10.8	.10148	172.8	75 55 00.87
.327	.97043	24.1	.26839	97.0	.98696	10.8	.10174	173.5	75 58 27.13
.328	.97067	24.0	.26842	97.1	.98707	10.8	.10202	174.0	76 01 53.40
.329	.97091	23.9	.26845	97.1	.98718	10.7	.10229	174.7	76 05 19.66
1.330	0.97115	23.8	0.26848	97.1	9.98729	10.7	9.10257	175.3	76 08 45.93
.331	.97139	23.8	.26850	97.1	.98739	10.6	.10283	176.0	76 12 12.19
.332	.97162	23.7	.26853	97.1	.98750	10.6	.10309	176.7	76 15 38.46
.333	.97186	23.6	.26856	97.2	.98760	10.5	.10335	177.4	76 19 04.72
.334	.97209	23.5	.26859	97.2	.98771	10.5	.10361	178.1	76 22 30.99
1.335	0.97233	23.4	0.26862	97.2	9.98781	10.4	9.10388	180.0	76 25 57.25
.336	.97256	23.3	.26864	97.3	.98792	10.4	.10414	180.8	76 29 23.53
.337	.97279	23.2	.26867	97.3	.98802	10.3	.10440	181.6	76 32 49.78
.338	.97303	23.1	.26870	97.3	.98812	10.3	.10466	182.4	76 36 16.05
.339	.97326	23.0	.26873	97.3	.98823	10.3	.10492	183.2	76 39 42.31
1.340	0.97348	22.9	0.26875	97.3	9.98833	10.2	9.10518	184.0	76 43 08.58
.341	.97371	22.8	.26878	97.4	.98843	10.2	.10544	184.8	76 46 34.84
.342	.97394	22.7	.26881	97.4	.98853	10.1	.10570	185.7	76 50 01.11
.343	.97417	22.6	.26883	97.4	.98863	10.1	.10596	186.5	76 53 27.37
.344	.97439	22.5	.26886	97.4	.98873	10.0	.10622	187.3	76 56 53.63
1.345	0.97462	22.4	0.26888	97.5	9.98883	10.0	9.10648	188.2	77 00 19.90
.346	.97484	22.3	.26891	97.5	.98893	9.9	.10674	189.0	77 03 46.16
.347	.97506	22.2	.26893	97.5	.98903	9.9	.10700	190.8	77 07 12.43
.348	.97528	22.1	.26896	97.5	.98913	9.8	.10726	191.7	77 10 38.69
.349	.97550	22.0	.26898	97.6	.98923	9.8	.10752	192.6	77 14 04.96
1.350	0.97572	21.9	0.26901	97.6	9.98933	9.7	9.10778	193.5	77 17 31.22
u	-1 sink u	$\omega F_0'$	cosh u	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	u

SMITHSONIAN TABLES

## Circular Functions.

u	sin u	$\omega F_0'$	cos u	$\omega F_0'$	log sin u	$\omega F_0'$	log cos u	$\omega F_0'$	u
I. 350	0.97572	21.0	0.21601	97.6	9.98933	9.7	9.34046	193.5	77 20 57.49
.351	.97594	21.8	.21803	97.6	.98942	9.7	.33852	194.4	77 21 23.75
.352	.97616	21.7	.21705	97.6	.98952	9.7	.33757	195.3	77 27 50.02
.353	.97638	21.6	.21608	97.6	.98962	9.6	.33661	196.2	77 31 16.28
.354	.97659	21.5	.21510	97.7	.98971	9.6	.33564	197.2	77 34 42.55
I. 355	0.97681	21.4	0.21413	97.7	9.98981	9.5	9.33067	198.1	77 38 08.81
.356	.97702	21.3	.21315	97.7	.98990	9.5	.32868	199.1	77 41 35.08
.357	.97723	21.2	.21217	97.7	.99000	9.4	.32669	200.0	77 45 01.34
.358	.97744	21.1	.21119	97.7	.99009	9.1	.32468	201.0	77 48 27.61
.359	.97765	21.0	.21022	97.8	.99019	9.3	.32267	202.0	77 51 53.87
I. 360	0.97785	20.9	0.20924	97.8	9.99028	9.3	9.32064	203.0	77 55 20.14
.361	.97807	20.8	.20826	97.8	.99037	9.2	.31861	204.0	77 58 46.40
.362	.97828	20.7	.20728	97.8	.99046	9.2	.31656	205.0	78 02 12.67
.363	.97849	20.6	.20630	97.8	.99056	9.2	.31451	206.0	78 05 38.93
.364	.97869	20.5	.20533	97.9	.99065	9.1	.31244	207.0	78 09 05.20
I. 365	0.97890	20.4	0.20435	97.9	9.99074	9.1	9.31037	208.0	78 12 31.46
.366	.97910	20.3	.20337	97.9	.99083	9.0	.30828	209.1	78 15 57.73
.367	.97931	20.2	.20239	97.9	.99092	9.0	.30619	210.1	78 19 23.99
.368	.97951	20.1	.20141	98.0	.99101	8.9	.30408	211.2	78 22 50.25
.369	.97971	20.0	.20043	98.0	.99110	8.9	.30196	212.3	78 26 16.52
I. 370	0.97991	19.9	0.19945	98.0	9.99119	8.8	9.29983	213.4	78 29 42.78
.371	.98011	19.8	.19847	98.0	.99127	8.8	.29769	214.5	78 33 09.05
.372	.98031	19.7	.19749	98.0	.99136	8.7	.29554	215.6	78 36 35.31
.373	.98050	19.6	.19651	98.1	.99145	8.7	.29338	216.7	78 40 01.58
.374	.98070	19.6	.19553	98.1	.99154	8.7	.29121	217.8	78 43 27.84
I. 375	0.98089	19.5	0.19455	98.1	9.99162	8.6	9.28903	219.0	78 46 54.11
.376	.98109	19.4	.19357	98.1	.99171	8.6	.28683	220.1	78 50 20.37
.377	.98128	19.3	.19259	98.1	.99179	8.5	.28462	221.3	78 53 46.64
.378	.98147	19.2	.19160	98.1	.99188	8.5	.28240	222.5	78 57 12.90
.379	.98166	19.1	.19062	98.2	.99196	8.4	.28017	223.7	79 00 39.17
I. 380	0.98185	19.0	0.18964	98.2	9.99205	8.4	9.27793	224.9	79 04 05.43
.381	.98204	18.9	.18866	98.2	.99213	8.3	.27568	226.1	79 07 31.70
.382	.98223	18.8	.18768	98.2	.99221	8.3	.27341	227.3	79 10 57.96
.383	.98242	18.7	.18669	98.2	.99230	8.3	.27113	228.5	79 14 24.23
.384	.98260	18.6	.18571	98.3	.99238	8.2	.26884	229.8	79 17 50.49
I. 385	0.98279	18.5	0.18473	98.3	9.99246	8.2	9.26654	231.1	79 21 16.76
.386	.98297	18.4	.18375	98.3	.99254	8.1	.26422	232.3	79 24 43.02
.387	.98316	18.3	.18276	98.3	.99262	8.1	.26189	233.6	79 28 09.29
.388	.98334	18.2	.18178	98.3	.99270	8.0	.25955	234.9	79 31 35.55
.389	.98352	18.1	.18080	98.4	.99278	8.0	.25719	236.3	79 35 01.82
I. 390	0.98370	18.0	0.17981	98.4	9.99285	7.9	9.25482	237.6	79 38 28.08
.391	.98388	17.9	.17883	98.4	.99294	7.9	.25244	238.9	79 41 54.35
.392	.98406	17.8	.17785	98.4	.99302	7.8	.25004	240.3	79 45 20.61
.393	.98424	17.7	.17686	98.4	.99310	7.8	.24763	241.7	79 48 46.88
.394	.98441	17.6	.17588	98.4	.99318	7.8	.24521	243.1	79 52 13.14
I. 395	0.98459	17.5	0.17489	98.5	9.99325	7.7	9.24277	244.5	79 55 39.40
.396	.98476	17.4	.17391	98.5	.99333	7.7	.24032	245.9	79 59 05.67
.397	.98494	17.3	.17292	98.5	.99341	7.6	.23785	247.4	80 02 31.93
.398	.98511	17.2	.17194	98.5	.99348	7.6	.23537	248.8	80 05 58.20
.399	.98528	17.1	.17095	98.5	.99356	7.5	.23288	250.3	80 09 24.46
I. 400	0.98545	17.0	0.16997	98.5	9.99363	7.5	9.23036	251.8	80 12 50.73
u	-1 sinh u	$\omega F_0'$	cosh u	$\omega F_0'$	log $\frac{\sinh u}{u}$	$\omega F_0'$	log cosh u	$\omega F_0'$	u

## Circular Functions:

$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$	$\sec u$	$\csc u$	$\log \sin u$	$\log \cos u$	$\log \tan u$	$\log \cot u$	$\log \sec u$	$\log \csc u$
1.400	0.98545	17.0	0.16097	98.5	0.01603	7.5	0.13030	25.68	80.12	50.73		
.401	.98562	16.9	.16898	98.6	.00471	7.4	.13274	25.63	80.06	16.00		
.402	.98579	16.8	.16800	98.6	.00478	7.4	.13530	25.58	80.00	13.35		
.403	.98596	16.7	.16701	98.6	.00486	7.4	.13787	25.54	80.03	09.52		
.404	.98612	16.6	.16602	98.6	.00493	7.3	.14047	25.50	80.00	35.79		
1.405	0.98629	16.5	0.16504	98.6	0.00499	7.3	0.14258	25.45	80.00	01.05		
.406	.98645	16.4	.16405	98.6	.00498	7.3	.14493	25.41	80.03	23.32		
.407	.98662	16.3	.16306	98.7	.00495	7.2	.14730	25.38	80.00	51.58		
.408	.98678	16.2	.16208	98.7	.00492	7.1	.14972	25.34	80.00	29.85		
.409	.98694	16.1	.16109	98.7	.00489	7.1	.15219	25.31	80.00	47.11		
1.410	0.98710	16.0	0.16010	98.7	0.00486	7.0	0.15410	25.28	80.00	13.38		
.411	.98726	15.9	.15912	98.7	.00483	7.0	.15617	25.25	80.00	39.61		
.412	.98742	15.8	.15813	98.7	.00480	7.0	.15830	25.22	80.00	05.91		
.413	.98758	15.7	.15714	98.8	.00477	6.9	.16042	25.19	80.00	32.17		
.414	.98773	15.6	.15615	98.8	.00474	6.9	.16255	25.16	80.00	58.44		
1.415	0.98789	15.5	0.15517	98.8	0.00471	6.8	0.16460	25.13	80.00	14.70		
.416	.98804	15.4	.15418	98.8	.00468	6.8	.16673	25.10	80.00	40.97		
.417	.98820	15.3	.15319	98.8	.00465	6.7	.16885	25.07	80.00	17.23		
.418	.98835	15.2	.15220	98.8	.00462	6.7	.17097	25.04	80.00	43.50		
.419	.98850	15.1	.15121	98.9	.00459	6.6	.17309	25.01	80.00	09.76		
1.420	0.98865	15.0	0.15023	98.9	0.00456	6.6	0.17521	24.98	80.00	36.03		
.421	.98880	14.9	.14924	98.9	.00453	6.6	.17734	24.95	80.00	62.29		
.422	.98895	14.8	.14825	98.9	.00450	6.5	.17946	24.92	80.00	18.55		
.423	.98910	14.7	.14726	98.9	.00447	6.5	.18158	24.89	80.00	44.82		
.424	.98924	14.6	.14627	98.9	.00444	6.4	.18370	24.86	80.00	71.08		
1.425	0.98939	14.5	0.14528	98.9	0.00441	6.4	0.18582	24.83	80.00	17.35		
.426	.98954	14.4	.14429	99.0	.00438	6.3	.18794	24.80	80.00	43.61		
.427	.98968	14.3	.14330	99.0	.00435	6.3	.19006	24.77	80.00	69.88		
.428	.98983	14.2	.14231	99.0	.00432	6.2	.19218	24.74	80.00	16.14		
.429	.98996	14.1	.14132	99.0	.00429	6.2	.19430	24.71	80.00	42.41		
1.430	0.99010	14.0	0.14033	99.0	0.00426	6.2	0.19642	24.68	80.00	68.67		
.431	.99024	13.9	.13934	99.0	.00423	6.1	.19854	24.65	80.00	14.94		
.432	.99038	13.8	.13835	99.0	.00420	6.1	.20066	24.62	80.00	41.20		
.433	.99052	13.7	.13736	99.1	.00417	6.0	.20278	24.59	80.00	67.47		
.434	.99066	13.6	.13637	99.1	.00414	6.0	.20490	24.56	80.00	13.73		
1.435	0.99079	13.5	0.13538	99.1	0.00411	5.9	0.20702	24.53	80.00	39.99		
.436	.99093	13.4	.13439	99.1	.00408	5.9	.20914	24.50	80.00	66.26		
.437	.99106	13.3	.13340	99.1	.00405	5.8	.21126	24.47	80.00	12.53		
.438	.99120	13.2	.13241	99.1	.00402	5.8	.21338	24.44	80.00	38.79		
.439	.99133	13.1	.13142	99.1	.00399	5.8	.21550	24.41	80.00	65.06		
1.440	0.99146	13.0	0.13043	99.1	0.00396	5.7	0.21762	24.38	80.00	11.33		
.441	.99159	12.9	.12943	99.2	.00393	5.7	.21974	24.35	80.00	37.59		
.442	.99172	12.8	.12844	99.2	.00390	5.6	.22186	24.32	80.00	63.85		
.443	.99185	12.7	.12745	99.2	.00387	5.6	.22398	24.29	80.00	10.12		
.444	.99197	12.6	.12646	99.2	.00384	5.5	.22610	24.26	80.00	36.38		
1.445	0.99210	12.5	0.12546	99.2	0.00381	5.5	0.22822	24.23	80.00	62.65		
.446	.99223	12.4	.12447	99.2	.00378	5.4	.23034	24.20	80.00	18.91		
.447	.99235	12.3	.12348	99.2	.00375	5.4	.23246	24.17	80.00	45.17		
.448	.99247	12.2	.12249	99.2	.00372	5.4	.23458	24.14	80.00	71.44		
.449	.99259	12.1	.12150	99.3	.00369	5.3	.23670	24.11	80.00	17.70		
1.450	0.99271	12.1	0.12050	99.3	0.00366	5.3	0.23882	24.08	80.00	43.97		
$u$	$-\log \sin u$	$\log \cos u$	$\log \tan u$	$\log \cot u$	$\log \sec u$	$\log \csc u$	$\log \sin u$	$\log \cos u$	$\log \tan u$	$\log \cot u$	$\log \sec u$	$\log \csc u$

Circular Functions.

$\alpha$	$\sin \alpha$	$\omega F_0'$	$\cos \alpha$	$\omega F_0'$	$\log \sin \alpha$	$\omega F_0'$	$\log \cos \alpha$	$\omega F_0'$	$u$
1.450	0.99271	12.1	0.12050	99.3	9.99682	5.3	9.08100	357.8	83 04 43.97
.451	.99283	12.0	.11951	99.3	.99588	5.2	.07710	300.8	83 08 10.23
.452	.99295	11.9	.11852	99.3	.99603	5.2	.07378	363.9	83 11 36.50
.453	.99307	11.8	.11752	99.3	.99608	5.1	.07013	367.0	83 15 02.76
.454	.99319	11.7	.11653	99.3	.99703	5.1	.06614	370.1	83 18 29.03
1.455	0.99330	11.6	0.11554	99.3	9.99768	5.1	9.06272	373.4	83 21 55.29
.456	.99342	11.5	.11454	99.3	.99713	5.0	.05897	376.7	83 25 21.56
.457	.99353	11.4	.11355	99.4	.99718	5.0	.05519	380.0	83 28 47.82
.458	.99365	11.3	.11256	99.4	.99723	4.9	.05137	383.4	83 32 14.09
.459	.99376	11.2	.11156	99.4	.99728	4.9	.04752	385.8	83 35 40.35
1.460	0.99387	11.1	0.11057	99.4	9.99733	4.8	9.04364	390.1	83 39 06.62
.461	.99398	11.0	.10958	99.4	.99738	4.8	.03971	394.0	83 42 32.88
.462	.99409	10.9	.10858	99.4	.99742	4.7	.03576	397.6	83 45 59.15
.463	.99420	10.8	.10759	99.4	.99747	4.7	.03176	401.3	83 49 25.41
.464	.99430	10.7	.10659	99.4	.99752	4.7	.02773	405.1	83 52 51.68
1.465	0.99441	10.6	0.10560	99.4	9.99756	4.6	9.02366	409.0	83 56 17.94
.466	.99451	10.5	.10460	99.5	.99761	4.6	.01985	412.9	83 59 44.21
.467	.99462	10.4	.10361	99.5	.99766	4.5	.01540	416.9	84 03 10.47
.468	.99472	10.3	.10262	99.5	.99770	4.5	.01121	421.0	84 06 36.74
.469	.99482	10.2	.10162	99.5	.99775	4.4	.00698	425.2	84 10 03.00
1.470	0.99492	10.1	0.10063	99.5	9.99779	4.4	9.00271	429.4	84 13 29.27
.471	.99502	10.0	.09963	99.5	.99783	4.3	8.99839	433.7	84 16 55.53
.472	.99512	9.9	.09864	99.5	.99788	4.3	.99403	438.2	84 20 21.79
.473	.99522	9.8	.09765	99.5	.99792	4.3	.98968	442.7	84 23 48.06
.474	.99532	9.7	.09665	99.5	.99796	4.2	.98518	447.3	84 27 14.32
1.475	0.99542	9.6	0.09565	99.5	9.99800	4.2	8.98068	452.0	84 30 40.59
.476	.99551	9.5	.09465	99.6	.99805	4.1	.97614	456.8	84 34 06.85
.477	.99560	9.4	.09366	99.6	.99809	4.1	.97155	461.7	84 37 33.12
.478	.99570	9.3	.09266	99.6	.99813	4.0	.96691	466.7	84 40 59.38
.479	.99579	9.2	.09167	99.6	.99817	4.0	.96222	471.8	84 44 25.65
1.480	0.99588	9.1	0.09067	99.6	9.99821	4.0	8.95747	477.0	84 47 51.91
.481	.99597	9.0	.08968	99.6	.99825	3.9	.95287	482.3	84 51 18.18
.482	.99606	8.9	.08868	99.6	.99829	3.9	.94821	487.8	84 54 44.44
.483	.99615	8.8	.08768	99.6	.99833	3.8	.94352	493.4	84 58 10.71
.484	.99624	8.7	.08669	99.6	.99836	3.8	.93796	499.1	85 01 36.97
1.485	0.99633	8.6	0.08569	99.6	9.99840	3.7	8.93294	504.9	85 05 03.24
.486	.99641	8.5	.08469	99.6	.99844	3.7	.92786	510.9	85 08 29.50
.487	.99649	8.4	.08370	99.6	.99847	3.6	.92272	517.1	85 11 55.77
.488	.99657	8.3	.08270	99.7	.99851	3.6	.91751	523.3	85 15 22.03
.489	.99666	8.2	.08171	99.7	.99855	3.6	.91225	529.8	85 18 48.30
1.490	0.99674	8.1	0.08071	99.7	9.99858	3.5	8.90692	536.3	85 22 14.56
.491	.99682	8.0	.07971	99.7	.99862	3.5	.90152	543.1	85 25 40.83
.492	.99690	7.9	.07871	99.7	.99865	3.4	.89606	550.0	85 29 07.09
.493	.99698	7.8	.07772	99.7	.99868	3.4	.89052	557.1	85 32 33.36
.494	.99705	7.7	.07672	99.7	.99872	3.3	.88491	564.4	85 35 59.62
1.495	0.99713	7.6	0.07572	99.7	9.99875	3.3	8.87923	571.9	85 39 25.89
.496	.99720	7.5	.07473	99.7	.99878	3.3	.87348	579.6	85 42 52.15
.497	.99728	7.4	.07373	99.7	.99882	3.2	.86764	587.4	85 46 18.41
.498	.99735	7.3	.07273	99.7	.99885	3.2	.86173	595.5	85 49 44.68
.499	.99742	7.2	.07173	99.7	.99888	3.1	.85573	603.9	85 53 10.94
1.500	0.99749	7.1	0.07074	99.7	9.99891	3.1	8.84955	612.4	85 56 37.21
$u$	$-\log \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
1.500	0.99749	7.0	0.07071	99.7	0.99891	3.1	8.81145	61.5	85° 50' 42.31
.501	.99757	7.0	.07071	99.8	.99891	3.1	.81145	61.5	86 00 03.42
.502	.99763	6.9	.07071	99.8	.99892	3.0	.81145	61.5	87 03 30.71
.503	.99770	6.8	.07071	99.8	.99893	3.0	.81145	61.5	88 00 56.00
.504	.99777	6.7	.07071	99.8	.99893	3.0	.81145	61.5	89 10 22.27
1.505	0.99781	6.6	0.06575	99.8	0.99896	2.9	8.81279	60.1	90 13 48.53
.506	.99780	6.5	.06475	99.8	.99899	2.8	.81125	60.3	91 12 14.80
.507	.99797	6.4	.06375	99.8	.99912	2.8	.80130	60.3	92 03 41.66
.508	.99803	6.3	.06275	99.8	.99914	2.7	.79705	60.6	93 01 07.33
.509	.99809	6.2	.06176	99.8	.99917	2.7	.79300	60.9	94 02 33.59
1.510	0.99815	6.1	0.05076	99.8	0.99930	2.6	8.79131	59.3	95 00 30.86
.511	.99814	6.0	.05076	99.8	.99933	2.6	.78703	59.3	96 04 36.12
.512	.99827	5.9	.05076	99.8	.99935	2.6	.78300	59.3	97 07 52.30
.513	.99833	5.8	.05077	99.8	.99937	2.5	.77906	59.6	98 09 18.05
.514	.99839	5.7	.05077	99.8	.99939	2.5	.77509	59.8	99 09 44.92
1.515	0.99841	5.6	0.05577	99.8	0.99933	2.4	8.77038	59.3	100 08 11.18
.516	.99850	5.5	.05477	99.8	.99935	2.4	.76633	59.3	101 04 37.45
.517	.99855	5.4	.05377	99.9	.99937	2.3	.76231	59.6	102 03 03.21
.518	.99861	5.3	.05277	99.9	.99939	2.3	.75830	59.8	103 03 39.08
.519	.99866	5.2	.05177	99.9	.99941	2.3	.75430	60.2	104 01 50.24
1.520	0.99871	5.1	0.05077	99.9	0.99944	2.2	8.75033	59.3	105 05 21.51
.521	.99876	5.0	.05078	99.9	.99946	2.2	.74633	59.3	106 03 38.77
.522	.99881	4.9	.05078	99.9	.99948	2.1	.74231	59.6	107 02 15.04
.523	.99886	4.8	.05078	99.9	.99950	2.1	.73833	59.8	108 01 41.30
.524	.99891	4.7	.05078	99.9	.99952	2.0	.73435	60.2	109 00 07.56
1.525	0.99895	4.6	0.05578	99.9	0.99953	2.0	8.73033	59.3	110 03 33.83
.526	.99900	4.5	.05478	99.9	.99955	1.9	.72633	59.3	111 00 00.09
.527	.99904	4.4	.05378	99.9	.99957	1.9	.72231	59.6	112 00 36.36
.528	.99908	4.3	.05278	99.9	.99959	1.9	.71833	59.8	113 01 52.62
.529	.99913	4.2	.05178	99.9	.99961	1.8	.71435	60.2	114 00 18.89
1.530	0.99917	4.1	0.05079	99.9	0.99961	1.8	8.71033	59.3	115 03 45.15
.531	.99921	4.0	.05079	99.9	.99963	1.7	.70633	59.3	116 04 11.42
.532	.99925	3.9	.05079	99.9	.99965	1.7	.70231	59.6	117 03 37.68
.533	.99930	3.8	.05079	99.9	.99966	1.7	.69833	59.8	118 01 03.95
.534	.99934	3.7	.05079	99.9	.99967	1.6	.69435	60.2	119 00 30.21
1.535	0.99936	3.6	0.05579	99.9	0.99967	1.6	8.69033	59.3	120 03 56.48
.536	.99940	3.5	.05479	99.9	.99969	1.5	.68633	59.3	121 00 32.74
.537	.99943	3.4	.05379	99.9	.99971	1.5	.68231	59.6	122 00 09.01
.538	.99946	3.3	.05279	99.9	.99972	1.4	.67833	59.8	123 01 25.27
.539	.99949	3.2	.05179	99.9	.99973	1.4	.67435	60.2	124 00 51.54
1.540	0.99953	3.1	0.05079	100.0	0.99979	1.3	8.66833	59.3	125 03 07.80
.541	.99956	3.0	.05079	100.0	.99981	1.3	.66433	59.3	126 04 34.07
.542	.99959	2.9	.05079	100.0	.99982	1.3	.66033	59.6	127 03 00.33
.543	.99961	2.8	.05079	100.0	.99983	1.2	.65633	59.8	128 01 26.60
.544	.99964	2.7	.05079	100.0	.99984	1.2	.65235	60.2	129 00 52.86
1.545	0.99967	2.6	0.05579	100.0	0.99986	1.1	8.64033	59.3	130 03 19.13
.546	.99969	2.5	.05479	100.0	.99987	1.1	.63633	59.3	131 04 45.39
.547	.99972	2.4	.05379	100.0	.99988	1.0	.63231	59.6	132 03 21.66
.548	.99974	2.3	.05279	100.0	.99989	1.0	.62833	59.8	133 01 47.92
.549	.99976	2.2	.05179	100.0	.99990	0.9	.62435	60.2	134 00 14.18
1.550	0.99978	2.1	0.05079	100.0	0.99991	0.9	8.62033	59.3	135 03 40.45
$u$	$-i \sinh u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \sinh u$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$

SMITHSONIAN TABLES

## Circular Functions.

$u$	$\sin u$	$\omega F_0'$	$\cos u$	$\omega F_0'$	$\log \sin u$	$\omega F_0'$	$\log \cos u$	$\omega F_0'$	$u$
1.550	0.99978	2,1	-0.02079	100,0	9.99991	0,9	8.31796	2088,0	88° 48' 30".45
.551	.99980	2,0	.01980		.99991	0,9	.29556	2193,5	88 51 56.71
.552	.99982	1,9	.01880		.99992	0,8	.27405	2310,3	88 55 22.98
.553	.99981	1,8	.01780		.99993	0,8	.25031	2440,1	88 58 49.21
.554	.99980	1,7	.01680		.99994	0,7	.22519	2585,4	89 02 15.51
1.555	0.99988	1,6	-0.01580	100,0	9.99995	0,7	8.19854	2749,1	89 05 41.77
.556	.99989	1,5	.01480		.99995	0,6	.17014	2934,9	89 09 08.04
.557	.99990	1,4	.01380		.99996	0,6	.13975	3147,7	89 12 34.30
.558	.99992	1,3	.01280		.99996	0,6	.10707	3393,7	89 16 00.57
.559	.99993	1,2	.01180		.99997	0,5	.07174	3681,4	89 19 26.83
1.560	0.99994	1,1	-0.01080	100,0	9.99997	0,5	8.03327	4022,5	89 22 53.10
.561	.99995	1,0	.00980		.99998	0,4	7.99106	4433,1	89 26 19.36
.562	.99996	0,9	.00880		.99998	0,4	.94430	4927,1	89 29 45.63
.563	.99997	0,8	.00780		.99999	0,3	.89189	5570,4	89 33 11.89
.564	.99998	0,7	.00680		.99999	0,3	.83227	6300,0	89 36 33.16
1.565	0.99998	0,6	-0.00580	100,0	9.99999	0,3	7.76315	7492,5	89 40 04.42
.566	.99999	0,5	.00480		0.00000	0,2	.68091	9054,7	89 43 30.69
.567	.99999	0,4	.00380		.00000	0,2	.57936	11439,8	89 46 56.95
.568	1.00000	0,3	.00280		.00000	0,1	.44659	15530,9	89 50 23.22
.569	1.00000	0,2	.00180		.00000	0,1	.25438	24176,8	89 53 49.48
1.570	1.00000	0,1	-0.00080	100,0	0.00000	0,0	6.99102	54537,4	89 57 15.75
.571	1.00000	0,0	.00020		.00000	0,0	6.30894	213228,5	90 00 42.01
.572	.00000	0,1	.00120		.00000	0,1	7.68051	36080,7	90 04 08.28
.573	.00000	0,2	.00220		.00000	0,1	.34315	19707,7	90 07 34.54
.574	0.00000	0,3	.00320		.00000	0,1	.50565	13556,1	90 11 00.81
1.575	0.99999	0,4	-0.00420	100,0	0.00000	0,2	7.62363	10331,2	90 14 27.07
.576	.99999	0,5	.00320		9.99999	0,2	.71631	8345,8	90 17 53.33
.577	.99998	0,6	.00220		.99999	0,3	.70225	7009,5	90 21 19.60
.578	.99997	0,7	.00120		.99999	0,3	.85755	6028,6	90 24 45.89
.579	.99997	0,8	.00020		.99999	0,4	.91400	5293,8	90 28 12.13
1.580	0.99996	0,9	-0.00020	100,0	9.99998	0,4	7.96396	4718,6	90 31 38.39
.581	.99995	1,0	.01020		.99998	0,4	8.00875	4256,1	90 35 04.66
.582	.99994	1,1	.01120		.99997	0,5	.04935	3876,2	90 38 30.92
.583	.99993	1,2	.01220		.99997	0,5	.08648	3558,5	90 41 57.19
.584	.99991	1,3	.01320		.99996	0,6	.12038	3289,0	90 45 23.45
1.585	0.99990	1,4	-0.01420	100,0	9.99996	0,6	8.15239	3057,4	90 48 49.72
.586	.99988	1,5	.01520		.99995	0,7	.18193	2856,3	90 52 15.98
.587	.99987	1,6	.01620		.99994	0,7	.20959	2630,0	90 55 42.25
.588	.99985	1,7	.01720		.99994	0,7	.23560	2524,2	90 59 08.51
.589	.99983	1,8	.01820		.99993	0,8	.26014	2385,5	91 02 34.78
1.590	0.99982	1,9	-0.01920	100,0	9.99992	0,8	8.28336	2261,2	91 06 01.04
.591	.99980	2,0	.02020		.99991	0,9	.30540	2149,3	91 09 27.31
.592	.99978	2,1	.02120		.99990	0,9	.32638	2047,9	91 12 53.57
.593	.99975	2,2	.02220		.99989	1,0	.34639	1955,6	91 16 19.84
.594	.99973	2,3	.02320		.99988	1,0	.36552	1871,3	91 19 46.10
1.595	0.99971	2,4	-0.02420	100,0	9.99987	1,1	8.38381	1791,0	91 23 12.37
.596	.99968	2,5	.02520		.99985	1,1	.40143	1722,8	91 26 38.63
.597	.99966	2,6	.02620		.99985	1,1	.41831	1657,0	91 30 04.90
.598	.99963	2,7	.02720		.99984	1,2	.43457	1595,1	91 33 31.16
.599	.99960	2,8	.02820		.99983	1,2	.45025	1539,4	91 36 57.43
1.600	0.99957	2,9	-0.02920	100,0	9.99981	1,3	8.46538	1485,7	91 40 23.69
$u$	$-\log \sin u$	$\omega F_0'$	$\cosh u$	$\omega F_0'$	$\log \frac{\sinh u}{u}$	$\omega F_0'$	$\log \cosh u$	$\omega F_0'$	$u$





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TABLE IV

THE ASCENDING AND DESCENDING EXPONENTIAL AND  
 $\text{Log}_{10}(e^u)$

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NOTE.—In Table IV, for  $u$  greater than 2.302, the tabulated values of the ascending exponential may sometimes be erroneous to one unit in the last place.

# The Exponential.

$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$
0.000	0.000 0000	1.000 000	1.000 0000	0.050	0.021 7147	1.051 271	0.951 2301
.001	.000 4343	.001 001	.000 999 0005	.051	.022 1400	.052 333	.950 2787
.002	.000 8686	.002 002	.998 0020	.052	.022 5653	.053 379	.949 3380
.003	.001 3029	.003 003	.997 0045	.053	.023 0420	.054 430	.948 3890
.004	.001 7372	.004 004	.996 0080	.054	.023 4519	.055 485	.947 4321
0.005	0.002 1715	1.005 013	0.995 0125	0.055	0.023 8862	1.056 541	0.946 4851
.006	.002 6058	.006 018	.994 0180	.056	.024 3395	.057 598	.945 5391
.007	.003 0401	.007 025	.993 0241	.057	.024 7838	.058 650	.944 5941
.008	.003 4744	.008 032	.992 0310	.058	.025 1891	.059 705	.943 6490
.009	.003 9087	.009 041	.991 0401	.059	.025 6234	.060 775	.942 7068
0.010	0.004 3429	1.010 050	0.990 0498	0.060	0.026 0577	1.061 837	0.941 7645
.011	.004 7772	.011 061	.989 0603	.061	.026 4920	.062 899	.940 8232
.012	.005 2115	.012 072	.988 0707	.062	.026 9363	.063 962	.939 8829
.013	.005 6458	.013 085	.987 0811	.063	.027 3806	.065 027	.938 9435
.014	.006 0801	.014 098	.986 0925	.064	.027 7948	.066 093	.938 0050
0.015	0.006 5144	1.015 113	0.985 1119	0.065	0.028 2391	1.067 159	0.937 0675
.016	.006 9487	.016 129	.984 1273	.066	.028 6834	.068 227	.936 1309
.017	.007 3830	.017 145	.983 1437	.067	.029 1277	.069 298	.935 1952
.018	.007 8173	.018 163	.982 1610	.068	.029 5720	.070 395	.934 2605
.019	.008 2516	.019 182	.981 1794	.069	.030 0163	.071 430	.933 3267
0.020	0.008 6859	1.020 201	0.980 1987	0.070	0.030 4606	1.072 508	0.932 3938
.021	.009 1202	.021 222	.979 2190	.071	.030 9049	.073 581	.931 4619
.022	.009 5545	.022 244	.978 2402	.072	.031 3492	.074 655	.930 5300
.023	.009 9888	.023 267	.977 2625	.073	.031 7935	.075 731	.929 6088
.024	.010 4231	.024 290	.976 2857	.074	.032 1378	.076 807	.928 6717
0.025	0.010 8574	1.025 315	0.975 3099	0.075	0.032 5821	1.077 884	0.927 7435
.026	.011 2917	.026 341	.974 3351	.076	.033 0264	.078 963	.926 8162
.027	.011 7260	.027 368	.973 3612	.077	.033 4707	.080 042	.925 8890
.028	.012 1603	.028 396	.972 3884	.078	.033 9150	.081 123	.924 9644
.029	.012 5945	.029 425	.971 4165	.079	.034 3593	.082 204	.924 0399
0.030	0.013 0288	1.030 455	0.970 4455	0.080	0.034 8036	1.083 287	0.923 1163
.031	.013 4631	.031 480	.969 4756	.081	.035 2479	.084 371	.922 1937
.032	.013 8974	.032 518	.968 5066	.082	.035 6922	.085 456	.921 2720
.033	.014 3317	.033 551	.967 5386	.083	.036 1365	.086 542	.920 3511
.034	.014 7660	.034 585	.966 5715	.084	.036 5807	.087 629	.919 4313
0.035	0.015 2003	1.035 620	0.965 6054	0.085	0.037 0250	1.088 712	0.918 5123
.036	.015 6346	.036 656	.964 6403	.086	.037 4693	.089 796	.917 5943
.037	.016 0689	.037 693	.963 6761	.087	.037 9136	.090 882	.916 6771
.038	.016 5032	.038 731	.962 7129	.088	.038 3579	.091 968	.915 7609
.039	.016 9375	.039 770	.961 7507	.089	.038 8022	.093 051	.914 8456
0.040	0.017 3718	1.040 811	0.960 7894	0.090	0.039 2465	1.094 174	0.913 9312
.041	.017 8061	.041 852	.959 8291	.091	.039 6908	.095 259	.913 0177
.042	.018 2404	.042 894	.958 8698	.092	.040 1351	.096 345	.912 1051
.043	.018 6747	.043 938	.957 9114	.093	.040 5794	.097 431	.911 1935
.044	.019 1090	.044 982	.956 9540	.094	.041 0237	.098 518	.910 2838
0.045	0.019 5433	1.046 028	0.955 9975	0.095	0.041 4680	1.099 650	0.909 3729
.046	.019 9775	.047 074	.955 0420	.096	.041 9123	.100 739	.908 4630
.047	.020 4118	.048 122	.954 0874	.097	.042 3566	.101 826	.907 5560
.048	.020 8461	.049 171	.953 1338	.098	.042 8009	.102 913	.906 6509
.049	.021 2804	.050 220	.952 1811	.099	.043 2452	.104 000	.905 7427
0.050	0.021 7147	1.051 271	0.951 2294	0.100	0.043 6894	1.105 121	0.904 8324
	$\log_{10}(e^x)$	$e^x$	$e^{-x}$		$\log_{10}(e^x)$	$e^x$	$e^{-x}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.100	0.043 4294	1.105 171	0.904 8374	0.150	0.065 1442	1.161 834	0.850 7080
.101	.043 8037	.106 277	.903 9330	.151	.065 5785	.162 997	.850 8177
.102	.044 2080	.107 383	.903 0266	.152	.066 0128	.164 160	.851 9383
.103	.044 7343	.108 491	.902 1270	.153	.066 4471	.165 325	.853 1297
.104	.045 1666	.109 600	.901 2253	.154	.066 8814	.166 491	.854 3720
0.105	0.045 6009	1.110 711	0.900 3245	0.155	0.067 3156	1.167 658	0.856 4152
.106	.046 0352	.111 822	.899 4246	.156	.067 7499	.168 826	.857 5592
.107	.046 4695	.112 931	.898 5257	.157	.068 1842	.169 996	.858 7011
.108	.046 9038	.114 048	.897 6276	.158	.068 6185	.171 165	.859 8468
.109	.047 3381	.115 162	.896 7304	.159	.069 0528	.172 338	.861 9961
0.110	0.047 7724	1.116 278	0.895 8341	0.160	0.069 4871	1.173 511	0.863 1438
.111	.048 2067	.117 395	.894 9387	.161	.069 9214	.174 685	.864 2921
.112	.048 6410	.118 513	.894 0443	.162	.070 3557	.175 860	.865 4412
.113	.049 0753	.119 632	.893 1507	.163	.070 7900	.177 037	.866 5912
.114	.049 5096	.120 752	.892 2580	.164	.071 2243	.178 214	.867 7420
0.115	0.049 9439	1.121 873	0.891 3661	0.165	0.071 6586	1.179 393	0.868 8937
.116	.050 3782	.122 966	.890 4752	.166	.072 0929	.180 573	.869 0462
.117	.050 8125	.124 119	.889 5852	.167	.072 5272	.181 751	.870 1995
.118	.051 2467	.125 244	.888 6961	.168	.072 9615	.182 937	.871 3538
.119	.051 6810	.126 370	.887 8078	.169	.073 3958	.184 120	.872 5089
0.120	0.052 1153	1.127 497	0.886 9204	0.170	0.073 8301	1.185 305	0.873 6648
.121	.052 5496	.128 625	.886 0340	.171	.074 2644	.186 491	.874 8216
.122	.052 9839	.129 751	.885 1484	.172	.074 6987	.187 678	.875 9792
.123	.053 4182	.130 884	.884 2637	.173	.075 1329	.188 866	.877 1376
.124	.053 8525	.132 016	.883 3798	.174	.075 5672	.190 056	.878 2969
0.125	0.054 2868	1.133 148	0.882 4960	0.175	0.076 0015	1.191 246	0.879 4570
.126	.054 7211	.134 282	.881 6148	.176	.076 4358	.192 438	.880 6180
.127	.055 1554	.135 417	.880 7337	.177	.076 8701	.193 631	.881 7798
.128	.055 5897	.136 553	.879 8534	.178	.077 3044	.194 825	.882 9424
.129	.056 0240	.137 690	.878 9740	.179	.077 7387	.196 021	.884 1059
0.130	0.056 4583	1.138 828	0.878 0951	0.180	0.078 1730	1.197 217	0.885 2702
.131	.056 8926	.139 968	.877 2173	.181	.078 6073	.198 415	.886 4354
.132	.057 3269	.141 108	.876 3410	.182	.079 0416	.199 614	.887 6013
.133	.057 7612	.142 250	.875 4651	.183	.079 4759	.200 814	.888 7682
.134	.058 1955	.143 393	.874 5901	.184	.079 9102	.202 016	.889 9358
0.135	0.058 6298	1.144 537	0.873 7159	0.185	0.080 3445	1.203 218	0.891 1043
.136	.059 0640	.145 682	.872 8426	.186	.080 7788	.204 422	.892 2736
.137	.059 4983	.146 828	.871 9702	.187	.081 2131	.205 627	.893 4437
.138	.060 9326	.147 976	.871 0987	.188	.081 6474	.206 834	.894 6147
.139	.060 3669	.149 124	.870 2280	.189	.082 0817	.208 041	.895 7865
0.140	0.060 8012	1.150 274	0.869 3582	0.190	0.082 5160	1.209 250	0.896 9591
.141	.061 2355	.151 425	.868 4893	.191	.082 9502	.210 459	.898 1326
.142	.061 6698	.152 577	.867 6213	.192	.083 3845	.211 671	.899 3069
.143	.062 1041	.153 730	.866 7541	.193	.083 8188	.212 883	.900 4820
.144	.062 5384	.154 884	.865 8877	.194	.084 2531	.214 096	.901 6579
0.145	0.062 9727	1.156 040	0.865 0223	0.195	0.084 6874	1.215 311	0.902 8347
.146	.063 4070	.157 196	.864 1577	.196	.085 1217	.216 527	.904 0122
.147	.063 8413	.158 354	.863 2940	.197	.085 5560	.217 744	.905 1905
.148	.064 2756	.159 513	.862 4311	.198	.085 9903	.218 962	.906 3699
.149	.064 7099	.160 673	.861 5691	.199	.086 4246	.220 182	.907 5499
0.150	0.065 1442	1.161 834	0.860 7080	0.200	0.086 8589	1.221 403	0.908 7308
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.200	0.086 8589	1.221 403	0.818 7308	0.250	0.108 5736	1.281 025	0.778
.201	.087 2912	.222 625	.817 9124	.251	.109 0079	.285 310	.778
.202	.087 7275	.223 848	.817 0919	.252	.109 4422	.286 530	.777
.203	.088 1618	.225 072	.816 2782	.253	.109 8765	.287 783	.776
.204	.088 5961	.226 298	.815 4624	.254	.110 3108	.289 172	.775
0.205	0.089 0304	1.227 525	0.814 6473	0.255	0.110 7451	1.290 464	0.774
.206	.089 4647	.228 753	.813 8331	.256	.111 1794	.291 753	.774
.207	.089 8990	.229 983	.813 0196	.257	.111 6137	.293 045	.773
.208	.090 3333	.231 213	.812 2070	.258	.112 0480	.294 339	.772
.209	.090 7675	.232 445	.811 3952	.259	.112 4823	.295 634	.771
0.210	0.091 2018	1.233 678	0.810 5842	0.260	0.112 9166	1.296 930	0.771
.211	.091 6361	.234 912	.809 7741	.261	.113 3509	.298 228	.770
.212	.092 0704	.236 148	.808 9647	.262	.113 7854	.299 527	.769
.213	.092 5047	.237 385	.808 1561	.263	.114 2194	.300 827	.768
.214	.092 9390	.238 623	.807 3484	.264	.114 6547	.302 128	.767
0.215	0.093 3733	1.239 862	0.806 5414	0.265	0.115 0889	1.303 431	0.767
.216	.093 8076	.241 103	.805 7353	.266	.115 5232	.304 735	.766
.217	.094 2419	.242 344	.804 9300	.267	.115 9576	.306 040	.765
.218	.094 6762	.243 587	.804 1254	.268	.116 3909	.307 347	.764
.219	.095 1105	.244 831	.803 3217	.269	.116 8252	.308 655	.764
0.220	0.095 5448	1.246 077	0.802 5188	0.270	0.117 2595	1.309 964	0.763
.221	.095 9791	.247 323	.801 7167	.271	.117 6938	.311 275	.763
.222	.096 4134	.248 571	.800 9154	.272	.118 1281	.312 587	.761
.223	.096 8477	.249 821	.800 1148	.273	.118 5624	.313 890	.761
.224	.097 2820	.251 071	.799 3151	.274	.118 9967	.315 195	.760
0.225	0.097 7163	1.252 323	0.798 5162	0.275	0.119 4310	1.316 501	0.759
.226	.098 1506	.253 576	.797 7181	.276	.119 8653	.317 808	.758
.227	.098 5848	.254 830	.796 9208	.277	.120 2996	.319 100	.758
.228	.099 0191	.256 085	.796 1241	.278	.120 7339	.320 389	.757
.229	.099 4534	.257 342	.795 3285	.279	.121 1682	.321 807	.756
0.230	0.099 8877	1.258 600	0.794 5336	0.280	0.121 6025	1.323 130	0.755
.231	.100 3220	.259 859	.793 7395	.281	.122 0367	.324 451	.755
.232	.100 7563	.261 120	.792 9461	.282	.122 4710	.325 779	.754
.233	.101 1906	.262 381	.792 1536	.283	.122 9053	.327 105	.753
.234	.101 6249	.263 644	.791 3618	.284	.123 3396	.328 433	.752
0.235	0.102 0592	1.264 909	0.790 5708	0.285	0.123 7739	1.329 762	0.752
.236	.102 4935	.266 171	.789 7807	.286	.124 2082	.331 092	.751
.237	.102 9278	.267 441	.788 9913	.287	.124 6425	.332 421	.750
.238	.103 3621	.268 709	.788 2027	.288	.125 0768	.333 752	.749
.239	.103 7964	.269 979	.787 4149	.289	.125 5111	.335 092	.749
0.240	0.104 2307	1.271 249	0.786 6279	0.290	0.125 9454	1.336 427	0.748
.241	.104 6650	.272 521	.785 8416	.291	.126 3797	.337 765	.747
.242	.105 0993	.273 794	.785 0562	.292	.126 8140	.339 103	.746
.243	.105 5336	.275 069	.784 2715	.293	.127 2484	.340 443	.746
.244	.105 9679	.276 344	.783 4876	.294	.127 6826	.341 784	.745
0.245	0.106 4021	1.277 621	0.782 7045	0.295	0.128 1169	1.343 126	0.744
.246	.106 8364	.278 900	.781 9222	.296	.128 5512	.344 470	.743
.247	.107 2707	.280 179	.781 1407	.297	.128 9855	.345 818	.743
.248	.107 7050	.281 460	.780 3599	.298	.129 4198	.347 163	.742
.249	.108 1393	.282 742	.779 5800	.299	.129 8541	.348 510	.741
0.250	0.108 5736	1.284 025	0.778 8008	0.300	0.130 2883	1.349 859	0.740
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

SMITHSONIAN TABLES

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.300	0.130 2883	1.349 859	0.740 8182	0.350	0.152 0031	1.419 068	0.704 6881
.301	.130 7226	.351 209	.740 0778	.351	.152 4374	.420 487	.703 9838
.302	.131 1569	.352 561	.739 3381	.352	.152 8717	.421 909	.703 2801
.303	.131 5912	.353 914	.738 5991	.353	.153 3060	.423 331	.702 5772
.304	.132 0255	.355 269	.737 8609	.354	.153 7402	.424 755	.701 8750
0.305	0.132 4598	1.356 625	0.737 1234	0.355	0.154 1745	1.426 181	0.701 1734
.306	.132 8941	.357 982	.736 3866	.356	.154 6088	.427 608	.700 4726
.307	.133 3284	.359 341	.735 6506	.357	.155 0431	.429 036	.699 7725
.308	.133 7627	.360 701	.734 9153	.358	.155 4774	.430 466	.699 0731
.309	.134 1970	.362 062	.734 1808	.359	.155 9117	.431 897	.698 3744
0.310	0.134 6313	1.363 425	0.733 4470	0.360	0.156 3460	1.433 329	0.697 6763
.311	.135 0656	.364 789	.732 7139	.361	.156 7803	.434 763	.696 9750
.312	.135 4999	.366 155	.731 9815	.362	.157 2146	.436 199	.696 2824
.313	.135 9342	.367 522	.731 2499	.363	.157 6489	.437 636	.695 5854
.314	.136 3685	.368 890	.730 5190	.364	.158 0832	.439 074	.694 8912
0.315	0.136 8028	1.370 259	0.729 7889	0.365	0.158 5175	1.440 514	0.694 1967
.316	.137 2371	.371 630	.729 0595	.366	.158 9518	.441 955	.693 5028
.317	.137 6714	.373 003	.728 3308	.367	.159 3861	.443 398	.692 8096
.318	.138 1056	.374 376	.727 6028	.368	.159 8204	.444 842	.692 1172
.319	.138 5399	.375 751	.726 8755	.369	.160 2547	.446 288	.691 4254
0.320	0.138 9742	1.377 128	0.726 1490	0.370	0.160 6890	1.447 735	0.690 7343
.321	.139 4085	.378 506	.725 4233	.371	.161 1233	.449 183	.690 0439
.322	.139 8428	.379 885	.724 6982	.372	.161 5575	.450 633	.689 3542
.323	.140 2771	.381 265	.723 9739	.373	.161 9918	.452 084	.688 6652
.324	.140 7114	.382 647	.723 2502	.374	.162 4261	.453 537	.687 9769
0.325	0.141 1457	1.384 031	0.722 5274	0.375	0.162 8604	1.454 991	0.687 2893
.326	.141 5800	.385 415	.721 8052	.376	.163 2947	.456 447	.686 6023
.327	.142 0143	.386 801	.721 0837	.377	.163 7290	.457 904	.685 9161
.328	.142 4486	.388 189	.720 3630	.378	.164 1633	.459 363	.685 2305
.329	.142 8829	.389 578	.719 6430	.379	.164 5976	.460 823	.684 5456
0.330	0.143 3172	1.390 968	0.718 9237	0.380	0.165 0319	1.462 285	0.683 8614
.331	.143 7515	.392 360	.718 2052	.381	.165 4662	.463 748	.683 1779
.332	.144 1858	.393 753	.717 4873	.382	.165 9005	.465 214	.682 4951
.333	.144 6201	.395 147	.716 7702	.383	.166 3348	.466 678	.681 8129
.334	.145 0544	.396 543	.716 0538	.384	.166 7691	.468 145	.681 1314
0.335	0.145 4887	1.397 940	0.715 3381	0.385	0.167 2034	1.469 614	0.680 4506
.336	.145 9229	.399 339	.714 6231	.386	.167 6377	.471 085	.679 7705
.337	.146 3572	.400 739	.713 9083	.387	.168 0720	.472 556	.679 0911
.338	.146 7915	.402 141	.713 1953	.388	.168 5063	.474 030	.678 4123
.339	.147 2258	.403 543	.712 4824	.389	.168 9406	.475 505	.677 7343
0.340	0.147 6601	1.404 948	0.711 7703	0.390	0.169 3748	1.476 981	0.677 0569
.341	.148 0944	.406 353	.711 0589	.391	.169 8091	.478 459	.676 3802
.342	.148 5287	.407 760	.710 3482	.392	.170 2434	.479 938	.675 7041
.343	.148 9630	.409 169	.709 6382	.393	.170 6777	.481 418	.675 0287
.344	.149 3973	.410 579	.708 9289	.394	.171 1120	.482 891	.674 3541
0.345	0.149 8316	1.411 990	0.708 2204	0.395	0.171 5463	1.484 384	0.673 6800
.346	.150 2659	.413 403	.707 5125	.396	.171 9806	.485 869	.673 0077
.347	.150 7002	.414 817	.706 8053	.397	.172 4149	.487 356	.672 3340
.348	.151 1345	.416 232	.706 0989	.398	.172 8492	.488 844	.671 6620
.349	.151 5688	.417 649	.705 3931	.399	.173 2835	.490 334	.670 9907
0.350	0.152 0031	1.419 068	0.704 6881	0.400	0.173 7178	1.491 825	0.670 3200
$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$x$	$\log_e(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_e(e^x)$	$e^x$	$e^{-x}$
0.400	0.173 7178	1.491 825	0.670 3200	0.450	0.195 4325	1.568 312	0.637 082
0.401	0.174 1521	1.493 317	0.669 6501	0.451	0.195 8668	1.570 321	0.636 508
0.402	0.174 5861	1.494 811	0.668 9807	0.452	0.196 3011	1.572 331	0.636 354
0.403	0.175 0207	1.496 307	0.668 3131	0.453	0.196 7354	1.574 341	0.635 761
0.404	0.175 4550	1.497 804	0.667 6441	0.454	0.197 1697	1.576 353	0.635 6827
0.405	0.175 8893	1.499 303	0.666 9768	0.455	0.197 6040	1.578 363	0.634 4380
0.406	0.176 3235	1.500 803	0.666 3102	0.456	0.198 0383	1.579 370	0.633 8138
0.407	0.176 7579	1.502 304	0.665 6442	0.457	0.198 4726	1.580 379	0.633 1801
0.408	0.177 1921	1.503 807	0.664 9780	0.458	0.198 9069	1.581 380	0.632 5475
0.409	0.177 6264	1.505 312	0.664 3142	0.459	0.199 3412	1.582 391	0.631 9152
0.410	0.178 0607	1.506 818	0.663 6503	0.460	0.199 7755	1.584 402	0.631 3336
0.411	0.178 4950	1.508 325	0.662 9860	0.461	0.200 2098	1.585 410	0.630 6527
0.412	0.178 9293	1.509 831	0.662 3243	0.462	0.200 6441	1.586 418	0.630 0333
0.413	0.179 3636	1.511 345	0.661 6653	0.463	0.201 0784	1.587 423	0.629 3636
0.414	0.179 7979	1.512 857	0.661 0010	0.464	0.201 5126	1.588 428	0.628 7036
0.415	0.180 2322	1.514 371	0.660 3401	0.465	0.201 9469	1.589 434	0.628 1351
0.416	0.180 6665	1.515 886	0.659 6803	0.466	0.202 3812	1.590 439	0.627 5073
0.417	0.181 1008	1.517 403	0.659 0209	0.467	0.202 8155	1.591 444	0.626 8801
0.418	0.181 5351	1.518 921	0.658 3622	0.468	0.203 2498	1.592 449	0.626 2535
0.419	0.181 9694	1.520 440	0.657 7042	0.469	0.203 6841	1.593 454	0.625 6276
0.420	0.182 4037	1.521 952	0.657 0463	0.470	0.204 1184	1.594 459	0.625 0023
0.421	0.182 8380	1.523 464	0.656 3881	0.471	0.204 5527	1.595 464	0.624 3776
0.422	0.183 2723	1.524 979	0.655 7300	0.472	0.204 9870	1.596 469	0.623 7535
0.423	0.183 7066	1.526 491	0.655 0725	0.473	0.205 4213	1.597 474	0.623 1301
0.424	0.184 1409	1.528 002	0.654 4139	0.474	0.205 8556	1.598 479	0.622 5073
0.425	0.184 5752	1.529 510	0.653 7568	0.475	0.206 2899	1.599 484	0.621 8851
0.426	0.185 0095	1.531 021	0.653 1003	0.476	0.206 7242	1.600 489	0.621 2635
0.427	0.185 4437	1.532 532	0.652 4436	0.477	0.207 1585	1.601 494	0.620 6425
0.428	0.185 8780	1.534 043	0.651 7864	0.478	0.207 5928	1.602 499	0.620 0212
0.429	0.186 3123	1.535 554	0.651 1292	0.479	0.208 0271	1.603 504	0.619 4005
0.430	0.186 7466	1.537 065	0.650 4721	0.480	0.208 4614	1.604 509	0.618 7834
0.431	0.187 1809	1.538 576	0.649 8150	0.481	0.208 8957	1.605 514	0.618 1639
0.432	0.187 6152	1.540 087	0.649 1579	0.482	0.209 3300	1.606 519	0.617 5471
0.433	0.188 0495	1.541 598	0.648 5008	0.483	0.209 7643	1.607 524	0.616 9308
0.434	0.188 4838	1.543 109	0.647 9423	0.484	0.210 1986	1.608 529	0.616 3132
0.435	0.188 9181	1.544 620	0.647 3847	0.485	0.210 6329	1.609 534	0.615 6922
0.436	0.189 3524	1.546 131	0.646 8272	0.486	0.211 0672	1.610 539	0.615 0818
0.437	0.189 7867	1.547 642	0.646 2697	0.487	0.211 5015	1.611 544	0.614 4670
0.438	0.190 2210	1.549 153	0.645 7122	0.488	0.211 9358	1.612 549	0.613 8530
0.439	0.190 6553	1.550 664	0.645 1547	0.489	0.212 3701	1.613 554	0.613 2393
0.440	0.191 0896	1.552 175	0.644 5972	0.490	0.212 8044	1.614 559	0.612 6261
0.441	0.191 5239	1.553 686	0.644 0397	0.491	0.213 2387	1.615 564	0.612 0131
0.442	0.191 9582	1.555 197	0.643 4822	0.492	0.213 6730	1.616 569	0.611 4004
0.443	0.192 3925	1.556 708	0.642 9247	0.493	0.214 1073	1.617 574	0.610 7873
0.444	0.192 8268	1.558 219	0.642 3672	0.494	0.214 5416	1.618 579	0.610 1808
0.445	0.193 2611	1.559 730	0.641 8097	0.495	0.214 9759	1.619 584	0.609 5700
0.446	0.193 6954	1.561 241	0.641 2522	0.496	0.215 4102	1.620 589	0.608 9606
0.447	0.194 1297	1.562 752	0.640 6947	0.497	0.215 8445	1.621 594	0.608 3530
0.448	0.194 5640	1.564 263	0.640 1372	0.498	0.216 2788	1.622 599	0.607 7449
0.449	0.194 9983	1.565 774	0.639 5797	0.499	0.216 7131	1.623 604	0.607 1375
0.450	0.195 4325	1.567 285	0.639 0222	0.500	0.217 1474	1.624 609	0.606 5307
$\log_e(e^x)$	$\log_e(e^x)$	$e^x$	$e^{-x}$	$\log_e(e^x)$	$\log_e(e^x)$	$e^x$	$e^{-x}$

SMITHSONIAN TABLES

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.500	0.217 1472	1.648 721	0.605 5307	0.550	0.238 8520	1.733 253	0.576 9498
.501	.217 5815	.650 371	.605 9244	.551	.239 2903	.734 987	.576 3731
.502	.218 0158	.652 022	.605 3188	.552	.239 7305	.736 733	.575 7971
.503	.218 4501	.653 675	.604 7138	.553	.240 1648	.738 461	.575 2216
.504	.218 8844	.655 329	.604 1094	.554	.240 5991	.740 200	.574 6466
0.505	0.219 3187	1.656 986	0.603 5056	0.555	0.241 0334	1.741 911	0.574 0723
.506	.219 7530	.658 643	.603 9024	.556	.241 4677	.743 684	.573 4985
.507	.220 1873	.660 303	.602 2998	.557	.241 9020	.745 428	.572 9253
.508	.220 6216	.661 964	.601 6978	.558	.242 3363	.747 175	.572 3526
.509	.221 0559	.663 627	.601 0934	.559	.242 7706	.748 923	.571 7806
0.510	0.221 4902	1.665 291	0.600 4956	0.560	0.243 2049	1.750 673	0.571 2091
.511	.221 9245	.666 957	.599 8954	.561	.243 6392	.752 424	.570 6381
.512	.222 3588	.668 625	.599 2958	.562	.244 0735	.754 177	.570 0678
.513	.222 7931	.670 295	.598 6968	.563	.244 5078	.755 932	.569 4980
.514	.223 2274	.671 966	.598 0984	.564	.244 9421	.757 689	.568 9288
0.515	0.223 6617	1.673 639	0.597 5006	0.565	0.245 3764	1.759 448	0.568 3601
.516	.224 0960	.675 313	.596 9034	.566	.245 8107	.761 208	.567 7921
.517	.224 5302	.676 984	.596 3068	.567	.246 2450	.762 970	.567 2246
.518	.224 9645	.678 667	.595 7108	.568	.246 6793	.764 734	.566 6576
.519	.225 3988	.680 346	.595 1154	.569	.247 1136	.766 500	.566 0912
0.520	0.225 8331	1.682 028	0.594 5205	0.570	0.247 5479	1.768 267	0.565 5254
.521	.226 2674	.683 711	.593 9263	.571	.247 9821	.770 036	.564 9602
.522	.226 7017	.685 395	.593 3327	.572	.248 4164	.771 807	.564 3955
.523	.227 1360	.687 081	.592 7397	.573	.248 8507	.773 580	.563 8314
.524	.227 5703	.688 769	.592 1472	.574	.249 2850	.775 354	.563 2679
0.525	0.228 0046	1.684 450	0.591 5551	0.575	0.249 7193	1.777 131	0.562 7049
.526	.228 4389	.686 150	.590 9641	.576	.250 1536	.778 907	.562 1424
.527	.228 8732	.687 843	.590 3731	.577	.250 5879	.780 688	.561 5806
.528	.229 3075	.689 538	.589 7834	.578	.251 0222	.782 470	.561 0193
.529	.229 7418	.691 234	.589 1939	.579	.251 4565	.784 253	.560 4585
0.530	0.230 1761	1.688 932	0.588 6050	0.580	0.251 8908	1.786 038	0.559 8984
.531	.230 6104	.690 632	.588 0167	.581	.252 3251	.787 825	.559 3387
.532	.231 0447	.692 334	.587 4289	.582	.252 7594	.789 614	.558 7797
.533	.231 4790	.694 037	.586 8418	.583	.253 1937	.791 405	.558 2212
.534	.231 9133	.695 742	.586 2553	.584	.253 6280	.793 197	.557 6632
0.535	0.232 3475	1.697 448	0.585 6693	0.585	0.254 0623	1.794 991	0.557 1059
.536	.232 7818	.699 157	.585 0839	.586	.254 4966	.796 787	.556 5490
.537	.233 2161	.700 867	.584 4991	.587	.254 9309	.798 585	.555 9928
.538	.233 6504	.702 578	.583 9149	.588	.255 3652	.800 384	.555 4370
.539	.234 0847	.704 292	.583 3313	.589	.255 7994	.802 185	.554 8819
0.540	0.234 5190	1.706 007	0.582 7483	0.590	0.256 2337	1.803 988	0.554 3273
.541	.234 9533	.707 724	.582 1658	.591	.256 6680	.805 793	.553 7732
.542	.235 3876	.709 442	.581 5839	.592	.257 1023	.807 600	.553 2197
.543	.235 8219	.711 163	.581 0026	.593	.257 5366	.809 409	.552 6658
.544	.236 2562	.712 885	.580 4219	.594	.257 9709	.811 219	.552 1114
0.545	0.236 6905	1.724 608	0.579 8418	0.595	0.258 4052	1.813 031	0.551 5626
.546	.237 1248	.726 334	.579 2622	.596	.258 8395	.814 845	.551 0113
.547	.237 5591	.728 061	.578 6833	.597	.259 2738	.816 661	.550 4605
.548	.237 9934	.729 790	.578 1049	.598	.259 7081	.818 478	.549 9104
.549	.238 4277	.731 521	.577 5270	.599	.260 1424	.820 298	.549 3607
0.550	0.238 8620	1.733 253	0.576 9498	0.600	0.260 5767	1.822 119	0.548 8116
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$



The Exponential.

$u$	$\log_e(u^u)$	$u^u$	$e^{-u}$	$u$	$\log_e(u^u)$	$u^u$	$e^{-u}$
0.600	0.260 5767	1.822 119	0.548 8116	0.650	0.282 0914	1.915 541	0.522 0
.601	.261 0110	.823 942	.548 2031	.651	.282 7357	.917 437	.521 5
.602	.261 4453	.825 767	.547 7151	.652	.283 1699	.919 376	.521 0
.603	.261 8796	.827 593	.547 1677	.653	.283 5943	.921 359	.520 5
.604	.262 3139	.829 422	.546 6308	.654	.284 0189	.923 283	.520 0
0.605	0.262 7482	1.831 252	0.546 0714	0.655	0.284 4409	1.925 143	0.519 5
.606	.263 1825	.833 081	.545 5380	.656	.284 8672	.927 030	.519 0
.607	.263 6168	.834 908	.544 9841	.657	.285 2935	.928 937	.518 5
.608	.264 0510	.836 751	.544 4897	.658	.285 7098	.930 827	.518 0
.609	.264 4853	.838 594	.543 8945	.659	.286 1301	.932 850	.517 5
0.610	0.264 9196	1.840 431	0.543 3509	0.660	0.286 5444	1.934 702	0.517 0
.611	.265 3539	.842 273	.542 8078	.661	.286 9687	.936 723	.516 5
.612	.265 7882	.844 116	.542 2653	.662	.287 3930	.938 660	.516 0
.613	.266 2225	.845 961	.541 7233	.663	.287 8172	.940 633	.515 5
.614	.266 6568	.847 808	.541 1818	.664	.288 2415	.942 547	.515 0
0.615	0.267 0911	1.849 657	0.540 6409	0.665	0.288 6658	1.944 491	0.514 5
.616	.267 5254	.851 507	.540 1005	.666	.289 0901	.946 440	.514 0
.617	.267 9597	.853 360	.539 5607	.667	.289 5144	.948 383	.513 5
.618	.268 3940	.855 214	.539 0214	.668	.290 9387	.950 333	.513 0
.619	.268 8283	.857 070	.538 4827	.669	.291 3630	.952 331	.512 5
0.620	0.269 2626	1.858 928	0.537 9441	0.670	0.291 7873	1.954 337	0.512 0
.621	.269 6969	.860 783	.537 4068	.671	.292 2116	.956 363	.511 5
.622	.270 1312	.862 639	.536 8691	.672	.292 6359	.958 350	.511 0
.623	.270 5655	.864 491	.536 3330	.673	.293 0602	.960 339	.510 5
.624	.270 9998	.866 347	.535 7970	.674	.293 4845	.962 331	.510 0
0.625	0.271 4341	1.868 306	0.535 2611	0.675	0.293 9088	1.964 333	0.509 5
.626	.271 8684	.870 115	.534 7261	.676	.294 3331	.966 338	.509 0
.627	.272 3026	.871 985	.534 1920	.677	.294 7574	.968 339	.508 5
.628	.272 7369	.873 859	.533 6581	.678	.295 1817	.970 331	.508 0
.629	.273 1712	.875 734	.533 1247	.679	.295 6060	.972 335	.507 5
0.630	0.273 6055	1.877 611	0.532 5918	0.680	0.296 0302	1.974 328	0.507 0
.631	.274 0398	.879 489	.532 0595	.681	.296 4545	.976 333	.506 5
.632	.274 4741	.881 370	.531 5277	.682	.296 8788	.978 339	.506 0
.633	.274 9084	.883 252	.530 9964	.683	.297 3031	.980 338	.505 5
.634	.275 3427	.885 136	.530 4657	.684	.297 7274	.982 339	.505 0
0.635	0.275 7770	1.887 022	0.529 9355	0.685	0.298 1517	1.984 322	0.504 5
.636	.276 2113	.888 910	.529 4058	.686	.298 5760	.986 335	.504 0
.637	.276 6456	.890 800	.528 8762	.687	.299 0003	.988 333	.503 5
.638	.277 0799	.892 692	.528 3481	.688	.299 4246	.990 332	.503 0
.639	.277 5142	.894 585	.527 8200	.689	.299 8489	.992 333	.502 5
0.640	0.277 9485	1.896 481	0.527 2931	0.690	0.300 2732	1.994 316	0.502 0
.641	.278 3828	.898 378	.526 7651	.691	.300 6975	.996 330	.501 5
.642	.278 8171	.900 278	.526 2380	.692	.301 1218	.998 337	.501 0
.643	.279 2514	.902 179	.525 7139	.693	.301 5461	.999 334	.500 5
.644	.279 6856	.904 082	.525 1875	.694	.301 9704	1.001 306	.500 0
0.645	0.280 1199	1.905 987	0.524 6625	0.695	0.302 3947	2.003 299	0.499 5
.646	.280 5542	.907 891	.524 1381	.696	.302 8190	.005 214	.499 0
.647	.280 9885	.909 793	.523 6143	.697	.303 2433	.007 221	.498 5
.648	.281 4228	.911 714	.523 0909	.698	.303 6675	.009 229	.498 0
.649	.281 8571	.913 626	.522 5681	.699	.304 0918	.011 240	.497 5
0.650	0.282 2914	1.915 541	0.522 0458	0.700	0.304 5161	2.013 753	0.497 0
$\log_e(u^u)$	$\log_e(u^u)$	$u^u$	$e^{-u}$	$\log_e(u^u)$	$\log_e(u^u)$	$u^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.700	0.301 0061	2.013 753	0.496 5853	0.750	0.325 7209	2.117 000	0.472 3666
.701	.301 4104	.015 767	.496 0850	.751	.326 1552	.119 118	.471 8941
.702	.301 8747	.017 781	.495 5931	.752	.326 5895	.121 238	.471 4228
.703	.305 3090	.019 803	.495 0978	.753	.327 0237	.123 361	.470 9516
.704	.305 7433	.021 824	.494 6029	.754	.327 4580	.125 485	.470 4809
0.705	0.306 1776	2.023 847	0.494 1685	0.755	0.327 8923	2.127 612	0.470 0106
.706	.306 6119	.025 872	.493 6147	.756	.328 3266	.129 710	.469 5408
.707	.307 0462	.027 898	.493 1213	.757	.328 7609	.131 871	.469 0715
.708	.307 4805	.029 927	.492 6285	.758	.329 1952	.134 004	.468 6027
.709	.307 9148	.031 958	.492 1361	.759	.329 6295	.136 139	.468 1343
0.710	0.308 3491	2.033 991	0.491 6442	0.760	0.330 0638	2.138 276	0.467 6664
.711	.308 7834	.036 026	.491 1528	.761	.330 4981	.140 416	.467 1990
.712	.309 2177	.038 063	.490 6619	.762	.330 9324	.142 557	.466 7320
.713	.309 6520	.040 102	.490 1715	.763	.331 3667	.144 701	.466 2655
.714	.310 0863	.042 144	.489 6815	.764	.331 8010	.146 846	.465 7995
0.715	0.310 5206	2.044 187	0.489 1921	0.765	0.332 2353	2.148 994	0.465 3339
.716	.310 9548	.046 232	.488 7032	.766	.332 6696	.151 144	.464 8688
.717	.311 3891	.048 279	.488 2147	.767	.333 1039	.153 297	.464 4042
.718	.311 8234	.050 328	.487 7267	.768	.333 5382	.155 451	.463 9400
.719	.312 2577	.052 380	.487 2393	.769	.333 9725	.157 608	.463 4763
0.720	0.312 6920	2.054 433	0.486 7523	0.770	0.334 4068	2.159 766	0.463 0131
.721	.313 1263	.056 469	.486 2657	.771	.334 8410	.161 927	.462 5503
.722	.313 5606	.058 546	.485 7797	.772	.335 2753	.164 090	.462 0880
.723	.313 9949	.060 606	.485 2942	.773	.335 7096	.166 255	.461 6261
.724	.314 4292	.062 667	.484 8091	.774	.336 1439	.168 423	.461 1647
0.725	0.314 8635	2.064 731	0.484 3246	0.775	0.336 5782	2.170 592	0.460 7038
.726	.315 2978	.066 797	.483 8405	.776	.337 0125	.172 764	.460 2433
.727	.315 7321	.068 855	.483 3560	.777	.337 4468	.174 938	.459 7833
.728	.316 1664	.070 935	.482 8738	.778	.337 8811	.177 114	.459 3237
.729	.316 6007	.073 007	.482 3911	.779	.338 3154	.179 292	.458 8646
0.730	0.317 0350	2.075 081	0.481 9090	0.780	0.338 7497	2.181 472	0.458 4060
.731	.317 4693	.077 157	.481 4273	.781	.339 1840	.183 655	.457 9478
.732	.317 9036	.079 235	.480 9461	.782	.339 6183	.185 840	.457 4901
.733	.318 3379	.081 315	.480 4654	.783	.340 0526	.188 027	.457 0329
.734	.318 7721	.083 398	.479 9852	.784	.340 4869	.190 216	.456 5760
0.735	0.319 2064	2.085 482	0.479 5055	0.785	0.340 9212	2.192 407	0.456 1197
.736	.319 6407	.085 569	.479 0262	.786	.341 3555	.194 600	.455 6638
.737	.320 0750	.087 657	.478 5474	.787	.341 7898	.196 796	.455 2081
.738	.320 5093	.089 748	.478 0691	.788	.342 2241	.198 994	.454 7534
.739	.320 9436	.091 841	.477 5913	.789	.342 6583	.201 194	.454 2989
0.740	0.321 3779	2.095 936	0.477 1139	0.790	0.343 0926	2.203 396	0.453 8448
.741	.321 8122	.093 032	.476 6370	.791	.343 5269	.205 601	.453 3912
.742	.322 2465	.100 132	.476 1606	.792	.343 9612	.207 808	.452 9380
.743	.322 6808	.102 233	.475 6847	.793	.344 3955	.210 017	.452 4853
.744	.323 1151	.104 336	.475 2093	.794	.344 8298	.212 228	.452 0330
0.745	0.323 5494	2.106 441	0.474 7343	0.795	0.345 2641	2.214 441	0.451 5812
.746	.323 9837	.108 549	.474 2598	.796	.345 6984	.216 657	.451 1299
.747	.324 4180	.110 659	.473 7858	.797	.346 1327	.218 874	.450 6790
.748	.324 8523	.112 770	.473 3122	.798	.346 5670	.221 091	.450 2285
.749	.325 2866	.114 884	.472 8392	.799	.347 0013	.223 316	.449 7785
0.750	0.325 7209	2.117 000	0.472 3666	0.800	0.347 4356	2.225 541	0.449 3290
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.800	0.347 4356	2.225 541	0.449 3390	0.850	0.369 1503	2.339 647	0.427 4149
.801	.347 8690	.227 768	.448 8709	.851	.370 5816	.341 684	.426 9877
.802	.348 3042	.229 996	.448 4312	.852	.370 6139	.341 341	.426 5610
.803	.348 7385	.232 228	.447 9839	.853	.370 1542	.340 976	.426 1346
.804	.349 1728	.234 461	.447 5352	.854	.370 8875	.340 624	.425 7087
0.805	0.349 6071	2.236 696	0.447 0879	0.855	0.371 3218	2.351 371	0.425 2834
.805	.350 0414	.238 934	.446 6411	.856	.371 7561	.340 272	.424 8581
.807	.350 4750	.241 171	.446 1946	.857	.372 1904	.340 642	.424 4335
.808	.350 9090	.243 417	.445 7487	.858	.372 6247	.340 340	.424 0093
.809	.351 3442	.245 661	.445 3031	.859	.373 0590	.340 799	.423 5855
0.810	0.351 7785	2.247 908	0.444 8581	0.860	0.373 4933	2.363 161	0.423 1621
.811	.352 2128	.250 157	.444 4134	.861	.373 9275	.340 545	.422 7391
.812	.352 6471	.252 408	.443 9692	.862	.374 3618	.340 293	.422 3160
.813	.353 0814	.254 662	.443 5255	.863	.374 7961	.340 591	.421 8945
.814	.353 5157	.256 918	.443 0822	.864	.375 2304	.340 632	.421 4734
0.815	0.353 9500	2.259 176	0.442 6393	0.865	0.375 6647	2.375 005	0.421 0516
.816	.354 3843	.259 436	.442 1949	.866	.376 0990	.340 382	.420 6307
.817	.354 8186	.261 699	.441 7509	.867	.376 5333	.340 701	.420 2101
.818	.355 2529	.265 953	.441 3074	.868	.376 9676	.340 142	.419 7903
.819	.355 6872	.268 230	.440 8743	.869	.377 4019	.340 585	.419 3707
0.820	0.356 1215	2.270 500	0.440 4317	0.870	0.377 8362	2.386 911	0.418 9513
.821	.356 5558	.272 771	.439 9914	.871	.378 2705	.340 390	.418 5328
.822	.356 9901	.275 045	.439 5517	.872	.378 7048	.340 682	.418 1145
.823	.357 4244	.277 322	.439 1133	.873	.379 1391	.340 682	.417 6966
.824	.357 8587	.279 600	.438 6734	.874	.379 5734	.340 428	.417 2791
0.825	0.358 2929	2.281 881	0.438 2350	0.875	0.380 0077	2.398 828	0.416 8620
.826	.358 7272	.284 161	.437 7970	.876	.380 4420	.340 328	.416 4454
.827	.359 1615	.286 440	.437 3591	.877	.380 8763	.340 628	.416 0291
.828	.359 5958	.288 717	.436 9223	.878	.381 3106	.340 684	.415 6133
.829	.360 0301	.291 027	.436 4856	.879	.381 7448	.340 840	.415 1979
0.830	0.360 4644	2.293 319	0.436 0493	0.880	0.382 1791	2.410 901	0.414 7830
.831	.360 8987	.295 613	.435 6135	.881	.382 6134	.340 312	.414 3683
.832	.361 3330	.297 910	.435 1781	.882	.383 0477	.340 520	.413 9542
.833	.361 7673	.300 209	.434 7431	.883	.383 4820	.340 143	.413 5404
.834	.362 2016	.302 510	.434 3085	.884	.383 9163	.340 593	.413 1271
0.835	0.362 6359	2.304 811	0.433 8745	0.885	0.384 3506	2.422 984	0.412 7142
.836	.363 0702	.307 120	.433 4408	.886	.384 7849	.340 300	.412 3017
.837	.363 5045	.309 428	.433 0076	.887	.385 2192	.340 635	.411 8896
.838	.363 9388	.311 739	.432 5748	.888	.385 6535	.340 361	.411 4779
.839	.364 3731	.314 052	.432 1424	.889	.386 0878	.340 690	.411 0656
0.840	0.364 8074	2.316 367	0.431 7105	0.890	0.386 5221	2.435 130	0.410 6538
.841	.365 2417	.316 685	.431 2790	.891	.386 9564	.340 596	.410 2423
.842	.365 6760	.321 001	.430 8480	.892	.387 3907	.340 908	.409 8313
.843	.366 1102	.323 327	.430 4173	.893	.387 8250	.341 219	.409 4206
.844	.366 5445	.325 651	.429 9871	.894	.388 2593	.341 520	.409 0101
0.845	0.366 9788	2.327 978	0.429 5571	0.895	0.388 6936	2.447 346	0.408 6006
.846	.367 4131	.330 307	.429 1280	.896	.389 1279	.341 284	.408 1922
.847	.367 8474	.332 638	.428 6991	.897	.389 5622	.341 535	.407 7841
.848	.368 2817	.334 972	.428 2705	.898	.389 9965	.341 689	.407 3766
.849	.368 7160	.337 308	.427 8426	.899	.390 4307	.341 945	.406 9704
0.850	0.369 1503	2.339 647	0.427 4149	0.900	0.390 8650	2.459 603	0.406 5667
$(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

ONIAN TABLES

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
0.900	0.390 8650	2.459 603	0.406 5607	0.950	0.412 5798	2.585 710	0.385 7410
.901	.391 2903	.462 034	.406 1633	.951	.413 0141	.588 297	.385 3515
.902	.391 7336	.464 527	.405 7573	.952	.413 4483	.593 886	.385 9683
.903	.392 1679	.466 993	.405 3518	.953	.413 8826	.593 478	.385 5825
.904	.392 6022	.469 461	.404 9466	.954	.414 3169	.595 073	.385 1971
0.905	0.393 0365	2.471 934	0.404 5419	0.955	0.414 7512	2.598 671	0.384 8121
.906	.393 4708	.474 495	.404 1375	.956	.415 1855	.601 271	.384 4275
.907	.393 9051	.476 881	.403 7330	.957	.415 6198	.603 873	.384 0433
.908	.394 3394	.479 359	.403 3301	.958	.416 0541	.606 478	.383 6594
.909	.394 7737	.481 839	.402 9269	.959	.416 4884	.609 085	.383 2760
0.910	0.395 2080	2.484 323	0.402 5242	0.960	0.416 9227	2.611 696	0.382 8929
.911	.395 6423	.486 868	.402 1219	.961	.417 3570	.614 309	.382 5102
.912	.396 0766	.489 296	.401 7200	.962	.417 7913	.616 925	.382 1279
.913	.396 5109	.491 787	.401 3185	.963	.418 2256	.619 543	.381 7459
.914	.396 9452	.494 280	.400 9173	.964	.418 6599	.622 164	.381 3644
0.915	0.397 3795	2.496 775	0.400 5166	0.965	0.419 0942	2.624 788	0.380 9832
.916	.397 8137	.499 273	.400 1163	.966	.419 5285	.627 414	.380 6024
.917	.398 2480	.501 774	.399 7164	.967	.419 9628	.630 042	.380 2220
.918	.398 6823	.504 277	.399 3160	.968	.420 3971	.632 674	.379 8420
.919	.399 1166	.506 782	.398 9178	.969	.420 8314	.635 308	.379 4623
0.920	0.399 5509	2.509 290	0.398 5190	0.970	0.421 2656	2.637 944	0.379 0830
.921	.399 9852	.511 801	.398 1207	.971	.421 6999	.640 584	.378 7041
.922	.400 4195	.514 314	.397 7228	.972	.422 1342	.643 225	.378 3256
.923	.400 8538	.516 830	.397 3253	.973	.422 5685	.645 870	.377 9475
.924	.401 2881	.519 348	.396 9281	.974	.423 0028	.648 517	.377 5697
0.925	0.401 7224	2.521 868	0.396 5314	0.975	0.423 4371	2.651 167	0.377 1924
.926	.402 1567	.524 391	.396 1351	.976	.423 8714	.653 820	.376 8153
.927	.402 5910	.526 917	.395 7391	.977	.424 3057	.656 475	.376 4387
.928	.403 0253	.529 445	.395 3436	.978	.424 7400	.659 133	.376 0625
.929	.403 4596	.531 976	.394 9485	.979	.425 1743	.661 793	.375 6866
0.930	0.403 8939	2.534 509	0.394 5537	0.980	0.425 6086	2.664 456	0.375 3111
.931	.404 3282	.537 045	.394 1594	.981	.426 0429	.667 122	.374 9360
.932	.404 7625	.539 584	.393 7654	.982	.426 4772	.669 790	.374 5612
.933	.405 1968	.542 124	.393 3718	.983	.426 9115	.672 462	.374 1869
.934	.405 6310	.544 668	.392 9786	.984	.427 3458	.675 135	.373 8129
0.935	0.406 0653	2.547 213	0.392 5859	0.985	0.427 7801	2.677 812	0.373 4392
.936	.406 4996	.549 762	.392 1935	.986	.428 2144	.680 491	.373 0660
.937	.406 9339	.552 313	.391 8015	.987	.428 6487	.683 173	.372 6931
.938	.407 3682	.554 867	.391 4099	.988	.429 0829	.685 857	.372 3206
.939	.407 8025	.557 423	.391 0187	.989	.429 5172	.688 545	.371 9485
0.940	0.408 2368	2.559 981	0.390 6278	0.990	0.429 9515	2.691 234	0.371 5767
.941	.408 6711	.562 513	.390 2374	.991	.430 3858	.693 927	.371 2053
.942	.409 1054	.565 107	.389 8474	.992	.430 8201	.696 622	.370 8343
.943	.409 5397	.567 673	.389 4577	.993	.431 2544	.699 320	.370 4636
.944	.409 9740	.570 242	.389 0684	.994	.431 6887	.702 021	.370 0934
0.945	0.410 4083	2.572 813	0.388 6796	0.995	0.432 1230	2.704 724	0.369 7234
.946	.410 8426	.575 387	.388 2911	.996	.432 5573	.707 430	.369 3539
.947	.411 2769	.577 964	.387 9030	.997	.432 9916	.710 139	.368 9847
.948	.411 7112	.580 543	.387 5153	.998	.433 4259	.712 851	.368 6159
.949	.412 1455	.583 125	.387 1280	.999	.433 8602	.715 565	.368 2475
0.950	0.412 5798	2.585 710	0.386 7410	1.000	0.434 2945	2.718 282	0.367 8794
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

The Exponential.

$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$
1.000	0.434 2945	2.718 282	0.367 8794	1.050	0.436 0002	2.857 651	0.349 9477
.001	.434 7388	.721 001	.367 5017	.051	.450 1135	.350 510	.349 5880
.002	.435 1631	.723 721	.367 1441	.052	.450 8778	.351 372	.349 2386
.003	.435 5974	.726 499	.366 7775	.053	.451 6421	.352 247	.348 8905
.004	.436 0317	.729 177	.366 4109	.054	.452 4064	.353 105	.348 5408
1.005	0.436 4660	2.731 007	0.366 0446	1.055	0.438 1807	2.871 025	0.348 1924
.006	.436 9002	.734 641	.365 6788	.056	.453 1650	.354 042	.347 8444
.007	.437 3345	.737 377	.365 3133	.057	.453 9493	.354 925	.347 4967
.008	.437 7688	.740 115	.364 9481	.058	.454 7336	.355 801	.347 1494
.009	.438 2031	.742 857	.364 5834	.059	.455 5179	.356 678	.346 8024
1.010	0.438 6374	2.745 601	0.364 2190	1.060	0.440 4522	2.886 471	0.346 4558
.011	.439 0717	.748 348	.363 8549	.061	.460 2365	.357 550	.346 1095
.012	.439 5060	.751 098	.363 4913	.062	.461 0208	.358 430	.345 7636
.013	.439 9403	.753 850	.363 1280	.063	.461 8051	.359 313	.345 4180
.014	.440 3746	.756 605	.362 7650	.064	.462 5894	.360 197	.345 0728
1.015	0.440 8089	2.759 363	0.362 4024	1.065	0.463 5736	2.900 839	0.344 7270
.016	.441 2432	.762 121	.362 0403	.066	.464 3579	.361 081	.344 3813
.017	.441 6775	.764 888	.361 6783	.067	.465 1422	.362 000	.344 0361
.018	.442 1118	.767 651	.361 3160	.068	.465 9265	.362 915	.343 6912
.019	.442 5461	.770 423	.360 9557	.069	.466 7108	.363 829	.343 3467
1.020	0.442 9804	2.773 195	0.360 5949	1.070	0.467 6951	2.915 370	0.343 0025
.021	.443 4147	.775 969	.360 2345	.071	.468 4794	.364 739	.342 6587
.022	.443 8490	.778 747	.359 8745	.072	.469 2637	.365 653	.342 3152
.023	.444 2833	.781 527	.359 5148	.073	.470 0480	.366 567	.341 9720
.024	.444 7175	.784 310	.359 1554	.074	.470 8323	.367 479	.341 6292
1.025	0.445 1518	2.787 095	0.358 7955	1.075	0.471 8166	2.930 903	0.341 2868
.026	.445 5861	.789 884	.358 4358	.076	.472 6009	.368 394	.340 9450
.027	.446 0204	.792 675	.358 0766	.077	.473 3852	.369 289	.340 6038
.028	.446 4547	.795 469	.357 7173	.078	.474 1695	.370 183	.340 2631
.029	.446 8890	.798 266	.357 3581	.079	.474 9538	.371 077	.339 9228
1.030	0.447 3233	2.801 066	0.357 0070	1.080	0.475 9380	2.946 680	0.339 5835
.031	.447 7576	.803 868	.356 6561	.081	.476 7223	.372 000	.339 2451
.032	.448 1919	.806 671	.356 3057	.082	.477 5066	.372 915	.338 9070
.033	.448 6262	.809 482	.355 9553	.083	.478 2909	.373 829	.338 5693
.034	.449 0605	.812 293	.355 6058	.084	.479 0752	.374 743	.338 2320
1.035	0.449 4948	2.815 106	0.355 2564	1.085	0.479 8595	2.962 410	0.337 8948
.036	.449 9291	.817 923	.354 9073	.086	.480 6438	.375 659	.337 5581
.037	.450 3634	.820 742	.354 5586	.087	.481 4281	.376 510	.337 2220
.038	.450 7977	.823 561	.354 2103	.088	.482 2124	.377 361	.336 8866
.039	.451 2320	.826 389	.353 8623	.089	.483 0000	.378 212	.336 5520
1.040	0.451 6663	2.829 217	0.353 5147	1.090	0.483 9843	2.978 274	0.336 2185
.041	.452 1006	.832 048	.353 1674	.091	.484 7686	.379 125	.335 8854
.042	.452 5349	.834 881	.352 8205	.092	.485 5529	.380 000	.335 5528
.043	.452 9691	.837 717	.352 4740	.093	.486 3372	.380 875	.335 2207
.044	.453 4034	.840 557	.352 1277	.094	.487 1215	.381 750	.334 8891
1.045	0.453 8377	2.843 399	0.351 7818	1.095	0.487 9058	2.994 684	0.334 5566
.046	.454 2720	.846 243	.351 4363	.096	.488 6901	.382 625	.334 2252
.047	.454 7063	.849 091	.351 0911	.097	.489 4744	.383 500	.333 8942
.048	.455 1406	.851 942	.350 7463	.098	.490 2587	.384 375	.333 5637
.049	.455 5749	.854 795	.350 4019	.099	.491 0430	.385 250	.333 2331
1.050	0.456 0092	2.857 651	0.349 9377	1.100	0.492 0273	3.000 166	0.332 8711
$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$

# The Exponential.

$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$
1.100	0.477 7439	3.604 165	0.332 8711	1.150	0.499 4387	3.158 193	0.316 6368
.101	.478 1582	.007 172	.332 5384	.151	.499 8729	.161 353	.316 3203
.102	.478 5925	.010 186	.332 2060	.152	.500 3072	.161 516	.316 0011
.103	.479 0268	.013 192	.331 8740	.153	.500 7415	.167 682	.315 6883
.104	.479 4611	.016 207	.331 5423	.154	.501 1758	.170 851	.315 3728
1.105	0.479 8954	3.019 221	0.331 2109	1.155	0.501 6101	3.174 023	0.315 0575
.106	.480 3297	.022 245	.330 8798	.156	.502 0444	.177 199	.314 7426
.107	.480 7640	.025 259	.330 5491	.157	.502 4787	.180 378	.314 4281
.108	.481 1983	.028 266	.330 2187	.158	.502 9130	.183 560	.314 1138
.109	.481 6326	.031 276	.329 8887	.159	.503 3473	.186 745	.313 7998
1.110	0.482 0669	3.034 358	0.329 5590	1.160	0.503 7816	3.189 933	0.313 4862
.111	.482 5012	.037 394	.329 2296	.161	.504 2159	.193 125	.313 1729
.112	.482 9355	.040 433	.328 9005	.162	.504 6502	.196 320	.312 8598
.113	.483 3698	.043 475	.328 5718	.163	.505 0845	.199 517	.312 5471
.114	.483 8041	.046 520	.328 2434	.164	.505 5188	.202 719	.312 2347
1.115	0.484 2383	3.049 568	0.327 9153	1.165	0.505 9531	3.205 923	0.311 9227
.116	.484 6726	.052 619	.327 5875	.166	.506 3874	.209 130	.311 6109
.117	.485 1069	.055 673	.327 2591	.167	.506 8217	.212 341	.311 2994
.118	.485 5412	.058 731	.326 9330	.168	.507 2560	.215 555	.310 9883
.119	.485 9755	.061 791	.326 6062	.169	.507 6902	.218 772	.310 6775
1.120	0.486 4098	3.064 854	0.326 2798	1.170	0.508 1245	3.221 993	0.310 3669
.121	.486 8441	.067 921	.325 9537	.171	.508 5588	.225 216	.310 0567
.122	.487 2784	.070 980	.325 6279	.172	.508 9931	.228 443	.309 7468
.123	.487 7127	.074 063	.325 3024	.173	.509 4274	.231 673	.309 4372
.124	.488 1470	.077 138	.324 9773	.174	.509 8617	.234 906	.309 1280
1.125	0.488 5813	3.080 217	0.324 6525	1.175	0.510 2960	3.238 143	0.308 8190
.126	.489 0156	.083 299	.324 3280	.176	.510 7303	.241 383	.308 5103
.127	.489 4499	.086 383	.324 0038	.177	.511 1646	.244 626	.308 2020
.128	.489 8842	.089 471	.323 6800	.178	.511 5989	.247 872	.307 8939
.129	.490 3185	.092 562	.323 3565	.179	.512 0332	.251 121	.307 5852
1.130	0.490 7528	3.095 657	0.323 0333	1.180	0.512 4675	3.254 374	0.307 2787
.131	.491 1871	.098 754	.322 7104	.181	.512 9018	.257 630	.306 9716
.132	.491 6214	.101 854	.322 3878	.182	.513 3361	.260 884	.306 6648
.133	.492 0556	.104 957	.322 0656	.183	.513 7704	.264 152	.306 3583
.134	.492 4899	.108 064	.321 7437	.184	.514 2047	.267 418	.306 0521
1.135	0.492 9242	3.111 174	0.321 4221	1.185	0.514 6390	3.270 687	0.305 7462
.136	.493 3585	.114 286	.321 1009	.186	.515 0733	.273 959	.305 4406
.137	.493 7928	.117 402	.320 7799	.187	.515 5075	.277 235	.305 1353
.138	.494 2271	.120 521	.320 4593	.188	.515 9418	.280 511	.304 8303
.139	.494 6614	.123 643	.320 1390	.189	.516 3761	.283 796	.304 5256
1.140	0.495 0957	3.126 768	0.319 8190	1.190	0.516 8104	3.287 081	0.304 2213
.141	.495 5300	.129 867	.319 4994	.191	.517 2447	.290 370	.303 9172
.142	.495 9643	.133 028	.319 1800	.192	.517 6790	.293 662	.303 6134
.143	.496 3986	.136 163	.318 8610	.193	.518 1133	.296 957	.303 3100
.144	.496 8329	.139 300	.318 5423	.194	.518 5476	.300 256	.303 0068
1.145	0.497 2672	3.142 441	0.318 2239	1.195	0.518 9819	3.303 558	0.302 7040
.146	.497 7015	.145 585	.317 9059	.196	.519 4162	.306 863	.302 4014
.147	.498 1358	.148 733	.317 5881	.197	.519 8505	.310 171	.302 0992
.148	.498 5701	.151 883	.317 2707	.198	.520 2848	.313 483	.301 7972
.149	.499 0044	.155 036	.316 9536	.199	.520 7191	.316 798	.301 4956
1.150	0.499 4387	3.158 193	0.316 6368	1.200	0.521 1534	3.320 117	0.301 1942
$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$

The Exponential.

$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$
1.200	0.521 1534	3.320 117	0.301 1012	1.250	0.543 8681	3.490 343	0.286 5048
.201	.521 5877	.323 439	.300 8932	.251	.543 3924	.343 835	.286 2181
.202	.522 0220	.326 734	.300 5921	.252	.543 7307	.347 331	.285 9354
.203	.522 4563	.330 092	.300 2930	.253	.544 1710	.350 830	.285 6466
.204	.522 8906	.333 424	.299 9918	.254	.544 6053	.354 332	.285 3611
1.205	0.523 3249	3.336 750	0.299 6920	1.255	0.545 0396	3.507 838	0.285 0758
.206	.523 7591	.340 098	.299 3925	.256	.545 4739	.358 338	.284 7909
.207	.524 1934	.343 439	.299 0932	.257	.545 9082	.361 831	.284 5063
.208	.524 6277	.346 781	.298 7913	.258	.546 3425	.365 328	.284 2210
.209	.525 0620	.350 133	.298 4956	.259	.546 7768	.368 828	.283 9378
1.210	0.525 4963	3.353 485	0.298 1973	1.260	0.547 2110	3.525 421	0.283 6540
.211	.525 9306	.356 840	.297 8982	.261	.547 6453	.372 420	.283 3705
.212	.526 3649	.360 198	.297 6015	.262	.548 0796	.375 916	.283 0873
.213	.526 7992	.363 560	.297 3040	.263	.548 5139	.379 414	.282 8043
.214	.527 2335	.366 925	.297 0090	.264	.548 9482	.382 914	.282 5217
1.215	0.527 6678	3.370 291	0.296 7100	1.265	0.549 3825	3.543 023	0.282 2393
.216	.528 1021	.373 660	.296 4135	.266	.549 8168	.386 416	.281 9572
.217	.528 5364	.377 031	.296 1172	.267	.550 2511	.389 913	.281 6754
.218	.528 9707	.380 400	.295 8212	.268	.550 6854	.393 413	.281 3938
.219	.529 4050	.383 802	.295 5255	.269	.551 1197	.396 914	.281 1126
1.220	0.529 8393	3.387 183	0.295 2302	1.270	0.551 5540	3.560 833	0.280 8316
.221	.530 2736	.390 577	.294 9351	.271	.551 9883	.399 415	.280 5509
.222	.530 7079	.393 969	.294 6403	.272	.552 4226	.402 913	.280 2705
.223	.531 1422	.397 375	.294 3458	.273	.552 8569	.406 414	.279 9904
.224	.531 5764	.400 761	.294 0516	.274	.553 2912	.409 914	.279 7105
1.225	0.532 0107	3.404 166	0.293 7577	1.275	0.553 7255	3.578 701	0.279 4310
.226	.532 4450	.407 572	.293 4611	.276	.554 1598	.412 413	.279 1517
.227	.532 8793	.410 981	.293 1668	.277	.554 5941	.415 913	.278 8727
.228	.533 3136	.414 394	.292 8727	.278	.555 0284	.419 414	.278 5939
.229	.533 7479	.417 810	.292 5780	.279	.555 4626	.422 914	.278 3155
1.230	0.534 1822	3.421 230	0.292 2826	1.280	0.555 8969	3.596 610	0.278 0373
.231	.534 6165	.424 652	.291 9861	.281	.556 3312	.426 413	.277 7591
.232	.535 0508	.428 079	.291 6896	.282	.556 7655	.429 913	.277 4818
.233	.535 4851	.431 509	.291 3930	.283	.557 1998	.433 414	.277 2044
.234	.535 9194	.434 942	.291 0957	.284	.557 6341	.436 914	.276 9274
1.235	0.536 3537	3.438 379	0.290 8318	1.285	0.558 0684	3.614 628	0.276 6506
.236	.536 7880	.438 810	.290 5341	.286	.558 5027	.440 413	.276 3741
.237	.537 2223	.442 262	.290 2362	.287	.558 9370	.443 913	.276 0978
.238	.537 6566	.445 700	.289 9386	.288	.559 3713	.447 414	.275 8219
.239	.538 0909	.449 160	.289 6417	.289	.559 8056	.450 914	.275 5462
1.240	0.538 5252	3.455 613	0.289 3812	1.290	0.560 2399	3.632 787	0.275 2708
.241	.538 9595	.452 071	.289 0850	.291	.560 6742	.454 413	.274 9956
.242	.539 3937	.455 532	.288 7880	.292	.561 1085	.457 913	.274 7208
.243	.539 8280	.459 036	.288 4917	.293	.561 5428	.461 414	.274 4462
.244	.540 2623	.462 501	.288 1950	.294	.561 9771	.464 914	.274 1710
1.245	0.540 6966	3.472 935	0.287 9409	1.295	0.562 4114	3.650 986	0.273 8979
.246	.541 1309	.465 969	.287 6451	.296	.562 8456	.468 413	.273 6241
.247	.541 5652	.469 483	.287 3496	.297	.563 2799	.471 913	.273 3506
.248	.541 9995	.473 000	.287 0541	.298	.563 7142	.475 414	.273 0774
.249	.542 4338	.476 521	.286 7584	.299	.564 1485	.478 914	.272 8045
1.250	0.542 8681	3.490 343	0.286 5048	1.300	0.564 5828	3.669 297	0.272 5318
$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$	$\log_{10}(e^x)$	$\log_{10}(e^x)$	$e^x$	$e^{-x}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.300	0.564 5828	3.669 297	0.272 5318	1.350	0.586 2976	3.857 426	0.259 2403
.301	.565 0171	.672 968	.272 2594	.351	.586 7318	.831 285	.258 9811
.302	.565 4514	.676 613	.271 9873	.352	.587 1661	.865 148	.258 7223
.303	.565 8857	.680 324	.271 7154	.353	.587 6004	.869 015	.258 4637
.304	.566 3200	.684 003	.271 4438	.354	.588 0347	.872 885	.258 2054
1.305	0.566 7543	3.687 689	0.271 1725	1.355	0.588 4690	3.876 761	0.257 9473
.305	.567 1885	.691 379	.270 9015	.355	.588 9033	.880 640	.257 6895
.307	.567 6229	.695 072	.270 6307	.357	.589 3376	.884 522	.257 4319
.308	.568 0572	.698 760	.270 3602	.358	.589 7719	.888 409	.257 1746
.309	.568 4915	.702 469	.270 0900	.359	.590 2062	.892 299	.256 9176
1.310	0.568 9258	3.706 174	0.269 8201	1.360	0.590 6405	3.896 193	0.256 6608
.311	.569 3601	.709 882	.269 5504	.361	.591 0748	.900 091	.256 4042
.312	.569 7944	.713 593	.269 2810	.362	.591 5091	.903 993	.256 1480
.313	.570 2287	.717 309	.269 0118	.363	.591 9434	.907 899	.255 8919
.314	.570 6629	.721 028	.268 7429	.364	.592 3777	.911 809	.255 6352
1.315	0.571 0972	3.724 751	0.268 4743	1.365	0.592 8120	3.915 723	0.255 3807
.316	.571 5315	.728 478	.268 2060	.366	.593 2463	.919 641	.255 1254
.317	.571 9658	.732 208	.267 9379	.367	.593 6806	.923 562	.254 8704
.318	.572 4001	.735 942	.267 6701	.368	.594 1149	.927 488	.254 6157
.319	.572 8344	.739 680	.267 4026	.369	.594 5491	.931 417	.254 3612
1.320	0.573 2687	3.743 421	0.267 1353	1.370	0.594 9834	3.935 351	0.254 1070
.321	.573 7030	.747 167	.266 8683	.371	.595 4177	.939 288	.253 8530
.322	.574 1373	.750 916	.266 6016	.372	.595 8520	.943 229	.253 5993
.323	.574 5716	.754 660	.266 3351	.373	.596 2863	.947 174	.253 3458
.324	.575 0059	.758 425	.266 0689	.374	.596 7206	.951 121	.253 0926
1.325	0.575 4402	3.762 185	0.265 8030	1.375	0.597 1549	3.955 077	0.252 8396
.326	.575 8745	.765 949	.265 5373	.376	.597 5892	.959 034	.252 5869
.327	.576 3088	.769 717	.265 2719	.377	.598 0235	.962 995	.252 3344
.328	.576 7431	.773 489	.265 0067	.378	.598 4578	.966 960	.252 0822
.329	.577 1774	.777 264	.264 7419	.379	.598 8921	.970 929	.251 8303
1.330	0.577 6117	3.781 043	0.264 4773	1.380	0.599 3264	3.974 902	0.251 5785
.331	.578 0460	.784 826	.264 2129	.381	.599 7607	.978 879	.251 3271
.332	.578 4802	.788 613	.263 9488	.382	.600 1950	.982 859	.251 0759
.333	.578 9145	.792 404	.263 6850	.383	.600 6293	.986 844	.250 8249
.334	.579 3488	.796 198	.263 4215	.384	.601 0636	.990 833	.250 5742
1.335	0.579 7831	3.799 906	0.263 1582	1.385	0.601 4979	3.994 825	0.250 3238
.336	.580 2174	.803 798	.262 8951	.386	.601 9322	.998 823	.250 0736
.337	.580 6517	.807 601	.262 6324	.387	.602 3664	4.002 821	.249 8237
.338	.581 0860	.811 413	.262 3699	.388	.602 8007	.006 828	.249 5740
.339	.581 5203	.815 226	.262 1076	.389	.603 2350	.010 837	.249 3245
1.340	0.581 9546	3.819 044	0.261 8457	1.390	0.603 6693	4.014 850	0.249 0753
.341	.582 3889	.822 864	.261 5840	.391	.604 1036	.018 867	.248 8264
.342	.582 8232	.826 689	.261 3225	.392	.604 5379	.022 888	.248 5777
.343	.583 2575	.830 518	.261 0613	.393	.604 9722	.026 913	.248 3292
.344	.583 6918	.834 350	.260 8004	.394	.605 4065	.030 942	.248 0810
1.345	0.584 1261	3.838 187	0.260 5397	1.395	0.605 8408	4.034 975	0.247 8330
.346	.584 5604	.842 027	.260 2793	.396	.606 2751	.039 012	.247 5853
.347	.584 9947	.845 871	.260 0191	.397	.606 7094	.043 053	.247 3379
.348	.585 4290	.849 718	.259 7593	.398	.607 1437	.047 098	.247 0907
.349	.585 8633	.853 570	.259 4996	.399	.607 5780	.051 147	.246 8437
1.350	0.586 2976	3.857 426	0.259 2403	1.400	0.608 0123	4.055 200	0.246 5970
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$



# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.400	0.608 0123	4.055 200	0.246 5970	1.450	0.629 7270	4.263 115	0.231 5703
.401	.608 4466	.059 257	.246 3595	.451	.630 1613	.207 380	.234 3358
.402	.608 8809	.063 318	.246 1043	.452	.630 5956	.271 649	.234 1016
.403	.609 3152	.067 384	.245 8583	.453	.631 0299	.275 923	.233 8676
.404	.609 7495	.071 453	.245 6125	.454	.631 4642	.280 201	.233 6339
1.405	0.610 1837	4.075 527	0.245 3671	1.455	0.631 8985	4.284 483	0.233 4004
.406	.610 6180	.079 604	.245 1218	.456	.632 3328	.288 770	.233 1671
.407	.611 0523	.083 686	.244 8768	.457	.632 7671	.293 061	.232 9340
.408	.611 4866	.087 772	.244 6321	.458	.633 2014	.297 356	.232 7012
.409	.611 9209	.091 861	.244 3875	.459	.633 6356	.301 656	.232 4686
1.410	0.612 3552	4.095 955	0.244 1433	1.460	0.634 0699	4.305 960	0.232 2363
.411	.612 7895	.100 053	.243 8993	.461	.634 5042	.310 268	.232 0042
.412	.613 2238	.104 156	.243 6555	.462	.634 9385	.314 580	.231 7723
.413	.613 6581	.108 262	.243 4120	.463	.635 3728	.318 897	.231 5406
.414	.614 0924	.112 372	.243 1687	.464	.635 8071	.323 218	.231 3092
1.415	0.614 5267	4.116 486	0.242 9256	1.465	0.636 2414	4.327 543	0.231 0780
.416	.614 9610	.120 605	.242 6828	.466	.636 6757	.331 873	.230 8470
.417	.615 3953	.124 728	.242 4402	.467	.637 1100	.336 207	.230 6163
.418	.615 8296	.128 854	.242 1979	.468	.637 5443	.340 545	.230 3858
.419	.616 2639	.132 985	.241 9559	.469	.637 9786	.344 888	.230 1555
1.420	0.616 6982	4.137 120	0.241 7140	1.470	0.638 4129	4.349 235	0.229 9255
.421	.617 1325	.141 260	.241 4724	.471	.638 8472	.353 587	.229 6957
.422	.617 5668	.145 403	.241 2311	.472	.639 2815	.357 942	.229 4661
.423	.618 0010	.149 550	.240 9900	.473	.639 7158	.362 303	.229 2367
.424	.618 4353	.153 702	.240 7491	.474	.640 1501	.366 667	.229 0076
1.425	0.618 8696	4.157 858	0.240 5085	1.475	0.640 5844	4.371 036	0.228 7787
.426	.619 3039	.162 018	.240 2681	.476	.641 0187	.375 409	.228 5501
.427	.619 7382	.166 182	.240 0270	.477	.641 4529	.379 787	.228 3216
.428	.620 1725	.170 350	.239 7880	.478	.641 8872	.384 169	.228 0934
.429	.620 6068	.174 523	.239 5484	.479	.642 3215	.388 555	.227 8654
1.430	0.621 0411	4.178 609	0.239 3089	1.480	0.642 7558	4.392 946	0.227 6377
.431	.621 4754	.182 880	.239 0697	.481	.643 1901	.397 341	.227 4102
.432	.621 9097	.187 055	.238 8308	.482	.643 6244	.401 740	.227 1829
.433	.622 3440	.191 254	.238 5921	.483	.644 0587	.406 144	.226 9558
.434	.622 7783	.195 447	.238 3536	.484	.644 4930	.410 553	.226 7280
1.435	0.623 2126	4.199 645	0.238 1154	1.485	0.644 9273	4.414 965	0.226 5023
.436	.623 6469	.203 847	.237 8774	.486	.645 3616	.419 383	.226 2760
.437	.624 0812	.208 053	.237 6396	.487	.645 7959	.423 804	.226 0498
.438	.624 5155	.212 263	.237 4021	.488	.646 2302	.428 230	.225 8230
.439	.624 9498	.216 477	.237 1648	.489	.646 6645	.432 661	.225 5981
1.440	0.625 3841	4.220 696	0.236 9278	1.490	0.647 0988	4.437 096	0.225 3727
.441	.625 8183	.224 919	.236 6909	.491	.647 5331	.441 535	.225 1474
.442	.626 2526	.229 146	.236 4544	.492	.647 9674	.445 979	.224 9224
.443	.626 6869	.233 377	.236 2180	.493	.648 4017	.450 427	.224 6976
.444	.627 1212	.237 612	.235 9819	.494	.648 8360	.454 879	.224 4730
1.445	0.627 5555	4.241 852	0.235 7461	1.495	0.649 2703	4.459 337	0.224 2486
.446	.627 9898	.246 096	.235 5104	.496	.649 7045	.463 798	.224 0245
.447	.628 4241	.250 344	.235 2751	.497	.650 1388	.468 261	.223 8006
.448	.628 8584	.254 597	.235 0399	.498	.650 5731	.472 735	.223 5769
.449	.629 2927	.258 854	.234 8050	.499	.651 0074	.477 210	.223 3534
1.450	0.629 7270	4.263 115	0.234 5703	1.500	0.651 4417	4.481 689	0.223 1302
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.500	0.651 4417	4.481 689	0.223 1302	1.550	0.673 1564	4.711 470	0.212 2480
.501	.651 8760	.486 173	.222 6071	.551	.673 5907	.716 184	.212 0358
.502	.652 3103	.490 661	.222 6843	.552	.674 0250	.720 903	.211 8239
.503	.652 7446	.495 154	.222 4618	.553	.674 4593	.725 626	.211 6122
.504	.653 1789	.499 652	.222 2394	.554	.674 8936	.730 354	.211 4007
1.505	0.653 6132	4.504 154	0.222 0173	1.555	0.675 3279	4.735 087	0.211 1894
.506	.654 0475	.508 660	.221 7954	.556	.675 7622	.739 824	.210 9783
.507	.654 4818	.513 171	.221 5737	.557	.676 1965	.744 566	.210 7674
.508	.654 9161	.517 685	.221 3522	.558	.676 6308	.749 313	.210 5568
.509	.655 3504	.522 206	.221 1310	.559	.677 0651	.754 065	.210 3463
1.510	0.655 7847	4.526 731	0.220 9100	1.560	0.677 4994	4.758 821	0.210 1361
.511	.656 2190	.531 260	.220 6892	.561	.677 9337	.763 582	.209 9260
.512	.656 6533	.535 793	.220 4686	.562	.678 3680	.768 348	.209 7162
.513	.657 0876	.540 331	.220 2482	.563	.678 8023	.773 119	.209 5066
.514	.657 5218	.544 874	.220 0281	.564	.679 2366	.777 895	.209 2972
1.515	0.657 9561	4.549 421	0.219 8082	1.565	0.679 6709	4.782 675	0.209 0880
.516	.658 3904	.553 973	.219 5885	.566	.680 1052	.787 460	.208 8790
.517	.658 8247	.558 529	.219 3690	.567	.680 5395	.792 250	.208 6703
.518	.659 2590	.563 090	.219 1497	.568	.680 9737	.797 045	.208 4617
.519	.659 6933	.567 655	.218 9307	.569	.681 4080	.801 844	.208 2533
1.520	0.660 1276	4.572 225	0.218 7119	1.570	0.681 8423	4.806 648	0.208 0452
.521	.660 5619	.576 800	.218 4933	.571	.682 2766	.811 457	.207 8372
.522	.660 9962	.581 379	.218 2749	.572	.682 7109	.816 271	.207 6295
.523	.661 4305	.585 962	.218 0567	.573	.683 1452	.821 090	.207 4220
.524	.661 8648	.590 551	.217 8388	.574	.683 5795	.825 913	.207 2147
1.525	0.662 2991	4.595 144	0.217 6211	1.575	0.684 0138	4.830 742	0.207 0076
.526	.662 7334	.599 741	.217 4035	.576	.684 4481	.835 575	.206 8006
.527	.663 1677	.604 343	.217 1862	.577	.684 8824	.840 413	.206 5940
.528	.663 6020	.608 950	.216 9692	.578	.685 3167	.845 256	.206 3875
.529	.664 0363	.613 561	.216 7523	.579	.685 7510	.850 103	.206 1812
1.530	0.664 4706	4.618 177	0.216 5357	1.580	0.686 1853	4.854 956	0.205 9751
.531	.664 9049	.622 797	.216 3192	.581	.686 6196	.859 813	.205 7692
.532	.665 3391	.627 422	.216 1030	.582	.687 0539	.864 675	.205 5636
.533	.665 7734	.632 052	.215 8870	.583	.687 4882	.869 543	.205 3581
.534	.666 2077	.636 687	.215 6713	.584	.687 9225	.874 415	.205 1528
1.535	0.666 6420	4.641 326	0.215 4557	1.585	0.688 3568	4.879 291	0.204 9478
.536	.667 0763	.645 959	.215 2403	.586	.688 7910	.884 173	.204 7429
.537	.667 5106	.650 617	.215 0252	.587	.689 2253	.889 060	.204 5383
.538	.667 9449	.655 270	.214 8103	.588	.689 6596	.893 951	.204 3339
.539	.668 3792	.659 928	.214 5956	.589	.690 0939	.898 848	.204 1296
1.540	0.668 8135	4.664 590	0.214 3811	1.590	0.690 5282	4.903 749	0.203 9256
.541	.669 2478	.669 257	.214 1668	.591	.690 9625	.908 655	.203 7218
.542	.669 6821	.673 929	.213 9528	.592	.691 3968	.913 566	.203 5182
.543	.670 1164	.678 605	.213 7389	.593	.691 8311	.918 482	.203 3148
.544	.670 5507	.683 285	.213 5253	.594	.692 2654	.923 403	.203 1115
1.545	0.670 9850	4.687 972	0.213 3119	1.595	0.692 6997	4.928 329	0.202 9085
.546	.671 4193	.692 652	.213 0987	.596	.693 1340	.933 260	.202 7057
.547	.671 8536	.697 357	.212 8857	.597	.693 5683	.938 195	.202 5031
.548	.672 2879	.702 057	.212 6729	.598	.694 0026	.943 136	.202 3007
.549	.672 7222	.706 761	.212 4603	.599	.694 4369	.948 082	.202 0985
1.550	0.673 1564	4.711 470	0.212 2480	1.600	0.694 8712	4.953 032	0.201 8965
$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.600	0.694 8712	4.953 032	0.201 8965	1.650	0.716 5859	5.206 980	0.192 0499
.601	.695 3055	.957 983	.201 6947	.651	.717 0202	.212 189	.191 8580
.602	.695 7398	.962 948	.201 4931	.652	.717 4545	.217 404	.191 6662
.603	.696 1741	.967 914	.201 2917	.653	.717 8888	.222 624	.191 4746
.604	.696 6083	.972 884	.201 0903	.654	.718 3231	.227 849	.191 2832
1.605	0.697 0426	4.977 850	0.200 8896	1.655	0.718 7574	5.233 080	0.191 0921
.606	.697 4759	.982 840	.200 6888	.656	.719 1917	.238 316	.190 9011
.607	.697 9112	.987 825	.200 4882	.657	.719 6260	.243 557	.190 7103
.608	.698 3455	.992 816	.200 2878	.658	.720 0603	.248 803	.190 5196
.609	.698 7798	.997 811	.200 0876	.659	.720 4945	.254 054	.190 3292
1.610	0.699 2141	5.002 811	0.199 8876	1.660	0.720 9288	5.259 311	0.190 1390
.611	.699 6484	.007 817	.199 6878	.661	.721 3631	.264 573	.189 9489
.612	.700 0827	.012 827	.199 4883	.662	.721 7974	.269 840	.189 7591
.613	.700 5170	.017 842	.199 2888	.663	.722 2317	.275 112	.189 5694
.614	.700 9513	.022 863	.199 0897	.664	.722 6660	.280 390	.189 3799
1.615	0.701 3856	5.027 888	0.198 8907	1.665	0.723 1003	5.285 673	0.189 1907
.616	.701 8199	.032 918	.198 6919	.666	.723 5346	.290 962	.189 0016
.617	.702 2542	.037 954	.198 4933	.667	.723 9689	.296 255	.188 8127
.618	.702 6885	.042 994	.198 2949	.668	.724 4032	.301 554	.188 6239
.619	.703 1228	.048 040	.198 0967	.669	.724 8375	.306 858	.188 4354
1.620	0.703 5571	5.053 090	0.197 8987	1.670	0.725 2718	5.312 168	0.188 2471
.621	.703 9914	.058 146	.197 7009	.671	.725 7061	.317 483	.188 0589
.622	.704 4256	.063 207	.197 5033	.672	.726 1404	.322 803	.187 8709
.623	.704 8599	.068 272	.197 3059	.673	.726 5747	.328 128	.187 6832
.624	.705 2942	.073 343	.197 1087	.674	.727 0090	.333 459	.187 4956
1.625	0.705 7285	5.078 410	0.196 9117	1.675	0.727 4433	5.338 795	0.187 3082
.626	.705 1628	.083 360	.196 7149	.676	.727 8776	.344 137	.187 1210
.627	.705 5971	.088 385	.196 5182	.677	.728 3118	.349 483	.186 9339
.628	.706 0314	.093 677	.196 3218	.678	.728 7461	.354 836	.186 7471
.629	.706 4657	.098 773	.196 1256	.679	.729 1804	.360 193	.186 5604
1.630	0.707 9000	5.103 875	0.195 9296	1.680	0.729 6147	5.365 556	0.186 3740
.631	.708 3343	.103 981	.195 7337	.681	.730 0490	.370 924	.186 1877
.632	.708 7685	.114 093	.195 5381	.682	.730 4833	.376 298	.186 0016
.633	.709 2029	.119 209	.195 3427	.683	.730 9176	.381 677	.185 8157
.634	.709 6372	.124 331	.195 1474	.684	.731 3519	.387 061	.185 6300
1.635	0.710 0715	5.129 458	0.194 9524	1.685	0.731 7862	5.392 451	0.185 4444
.636	.710 5058	.134 550	.194 7575	.686	.732 2205	.397 846	.185 2591
.637	.710 9401	.139 727	.194 5629	.687	.732 6548	.403 247	.185 0739
.638	.711 3744	.144 869	.194 3684	.688	.733 0891	.408 653	.184 8889
.639	.711 8087	.150 017	.194 1741	.689	.733 5234	.414 064	.184 7041
1.640	0.712 2430	5.155 170	0.193 9800	1.690	0.733 9577	5.419 481	0.184 5195
.641	.712 6772	.160 327	.193 7852	.691	.734 3920	.424 903	.184 3351
.642	.713 1115	.165 490	.193 5925	.692	.734 8263	.430 331	.184 1509
.643	.713 5458	.170 658	.193 3990	.693	.735 2606	.435 764	.183 9668
.644	.713 9801	.175 831	.193 2057	.694	.735 6949	.441 202	.183 7829
1.645	0.714 4144	5.181 010	0.193 0126	1.695	0.736 1291	5.446 646	0.183 5992
.646	.714 8487	.186 194	.192 8196	.696	.736 5634	.452 095	.183 4157
.647	.715 2830	.191 382	.192 6259	.697	.736 9977	.457 550	.183 2324
.648	.715 7173	.196 576	.192 4344	.698	.737 4320	.463 010	.183 0493
.649	.716 1516	.201 775	.192 2421	.699	.737 8663	.468 476	.182 8663
1.650	0.716 5859	5.206 980	0.192 0499	1.700	0.738 3006	5.473 947	0.182 6835
$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

SMITHSONIAN TABLES

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.700	0.738 3006	5.473 947	0.182 6835	1.750	0.760 0153	5.751 603	0.173 7739
.701	.738 7349	.479 424	.182 5009	.751	.760 4495	.760 300	.173 6003
.702	.739 1692	.484 906	.182 3185	.752	.760 8839	.760 123	.173 4267
.703	.739 6035	.490 394	.182 1363	.753	.761 3182	.771 892	.173 2534
.704	.740 0378	.495 887	.181 9542	.754	.761 7525	.777 607	.173 0802
1.705	0.740 4721	5.501 386	0.181 7721	1.755	0.762 1868	5.783 448	0.172 9072
.705	.740 9064	.508 899	.181 5907	.756	.762 6211	.789 234	.172 7344
.707	.741 3407	.512 399	.181 4092	.757	.763 0554	.795 020	.172 5618
.708	.741 7750	.517 915	.181 2279	.758	.763 4897	.800 821	.172 3893
.709	.742 2093	.523 435	.181 0467	.759	.763 9240	.806 628	.172 2170
1.710	0.742 6436	5.528 961	0.180 8658	1.760	0.764 3583	5.812 437	0.172 0449
.711	.743 0779	.534 493	.180 6850	.761	.764 7926	.818 253	.171 8729
.712	.743 5122	.540 030	.180 5044	.762	.765 2269	.824 074	.171 7011
.713	.743 9464	.545 573	.180 3240	.763	.765 6612	.829 901	.171 5295
.714	.744 3807	.551 122	.180 1438	.764	.766 0955	.835 734	.171 3581
1.715	0.744 8150	5.556 676	0.179 9637	1.765	0.766 5298	5.841 572	0.171 1858
.716	.745 2493	.562 245	.179 7838	.766	.766 9641	.847 417	.171 0157
.717	.745 6836	.567 800	.179 6042	.767	.767 3983	.853 267	.170 8448
.718	.746 1179	.573 371	.179 4246	.768	.767 8326	.859 123	.170 6740
.719	.746 5522	.578 947	.179 2453	.769	.768 2669	.864 985	.170 5034
1.720	0.746 9865	5.584 528	0.179 0661	1.770	0.768 7012	5.870 853	0.170 3330
.721	.747 4208	.590 116	.178 8872	.771	.769 1355	.876 727	.170 1627
.722	.747 8551	.595 709	.178 7081	.772	.769 5698	.882 607	.169 9927
.723	.748 2894	.601 307	.178 5288	.773	.770 0041	.888 492	.169 8228
.724	.748 7237	.606 911	.178 3513	.774	.770 4384	.894 381	.169 6530
1.725	0.749 1580	5.612 521	0.178 1731	1.775	0.770 8727	5.900 281	0.169 4834
.725	.749 5923	.618 135	.177 9950	.775	.771 3070	.906 184	.169 3141
.727	.750 0266	.623 757	.177 8171	.777	.771 7413	.912 094	.169 1448
.728	.750 4609	.629 384	.177 6393	.778	.772 1756	.918 009	.168 9758
.729	.750 8952	.635 016	.177 4618	.779	.772 6099	.923 930	.168 8069
1.730	0.751 3295	5.640 654	0.177 2844	1.780	0.773 0442	5.929 856	0.168 6381
.731	.751 7637	.646 297	.177 1072	.781	.773 4785	.935 789	.168 4696
.732	.752 1980	.651 947	.176 9302	.782	.773 9128	.941 728	.168 3012
.733	.752 6323	.657 601	.176 7534	.783	.774 3471	.947 673	.168 1330
.734	.753 0666	.663 262	.176 5767	.784	.774 7814	.953 623	.167 9649
1.735	0.753 5009	5.668 928	0.176 4002	1.785	0.775 2157	5.959 580	0.167 7971
.736	.753 9352	.674 000	.176 2230	.785	.775 6499	.965 543	.167 6293
.737	.754 3695	.680 277	.176 0478	.787	.776 0842	.971 511	.167 4618
.738	.754 8038	.685 950	.175 8718	.788	.776 5185	.977 485	.167 2944
.739	.755 2381	.691 649	.175 6950	.789	.776 9528	.983 466	.167 1272
1.740	0.755 6724	5.697 343	0.175 5204	1.790	0.777 3871	5.989 452	0.166 9602
.741	.756 1067	.703 041	.175 3450	.791	.777 8214	.995 415	.166 7933
.742	.756 5410	.708 750	.175 1697	.792	.778 2557	6.001 443	.166 6256
.743	.756 9753	.714 461	.174 9946	.793	.778 6900	.007 448	.166 4600
.744	.757 4096	.720 178	.174 8197	.794	.779 1243	.013 458	.166 2937
1.745	0.757 8439	5.725 901	0.174 6450	1.795	0.779 5586	6.019 475	0.166 1275
.746	.758 2782	.731 630	.174 4704	.795	.779 9929	.025 457	.165 9614
.747	.758 7125	.737 365	.174 2960	.797	.780 4272	.031 526	.165 7955
.748	.759 1468	.743 105	.174 1218	.798	.780 8615	.037 590	.165 6298
.749	.759 5810	.748 851	.173 9478	.799	.781 2958	.043 601	.165 4643
1.750	0.760 0153	5.754 603	0.173 7739	1.800	0.781 7301	6.049 647	0.165 2989
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.800	0.781 7301	6.049 647	0.165 2089	1.850	0.803 4418	6.359 820	0.157 2372
.801	.782 1614	.055 700	.165 1337	.851	.803 8791	.365 183	.157 0800
.802	.782 5687	.061 759	.164 9686	.852	.804 3134	.372 552	.156 9230
.803	.783 0330	.067 824	.164 8037	.853	.804 7477	.378 928	.156 7662
.804	.783 4672	.073 895	.164 6390	.854	.805 1820	.385 310	.156 6095
1.805	0.783 9015	6.079 971	0.164 4745	1.855	0.805 6163	6.391 698	0.156 4529
.806	.784 3358	.085 054	.164 3101	.856	.806 0506	.398 093	.156 2966
.807	.784 7701	.092 144	.164 1458	.857	.806 4849	.404 491	.156 1403
.808	.785 2044	.098 239	.163 9818	.858	.806 9191	.410 902	.155 9843
.809	.785 6387	.104 340	.163 8179	.859	.807 3534	.417 316	.155 8281
1.810	0.786 0730	6.110 447	0.163 6541	1.860	0.807 7877	6.423 737	0.155 6726
.811	.786 5073	.116 561	.163 4906	.861	.808 2220	.430 161	.155 5170
.812	.786 9416	.122 681	.163 3272	.862	.808 6563	.436 597	.155 3616
.813	.787 3759	.128 806	.163 1639	.863	.809 0906	.443 037	.155 2063
.814	.787 8102	.134 933	.163 0008	.864	.809 5249	.449 483	.155 0512
1.815	0.788 2445	6.141 076	0.162 8379	1.865	0.809 9592	6.455 936	0.154 8962
.816	.788 6788	.147 220	.162 6752	.866	.810 3935	.462 395	.154 7414
.817	.789 1131	.153 371	.162 5126	.867	.810 8278	.468 861	.154 5867
.818	.789 5474	.159 527	.162 3501	.868	.811 2621	.475 333	.154 4322
.819	.789 9817	.165 660	.162 1879	.869	.811 6964	.481 811	.154 2779
1.820	0.790 4160	6.171 858	0.162 0258	1.870	0.812 1307	6.488 296	0.154 1237
.821	.790 8503	.178 033	.161 8638	.871	.812 5650	.494 788	.153 9696
.822	.791 2845	.184 215	.161 7020	.872	.812 9993	.501 286	.153 8157
.823	.791 7188	.190 402	.161 5404	.873	.813 4336	.507 791	.153 6620
.824	.792 1531	.196 595	.161 3789	.874	.813 8679	.514 302	.153 5081
1.825	0.792 5874	6.202 795	0.161 2176	1.875	0.814 3022	6.520 819	0.153 3550
.826	.793 0217	.209 001	.161 0565	.876	.814 7364	.527 343	.153 2017
.827	.793 4560	.215 213	.160 8955	.877	.815 1707	.533 874	.153 0486
.828	.793 8903	.221 431	.160 7347	.878	.815 6050	.540 411	.152 8956
.829	.794 3246	.227 656	.160 5741	.879	.816 0393	.546 955	.152 7428
1.830	0.794 7589	6.233 887	0.160 4136	1.880	0.816 4736	6.553 505	0.152 5901
.831	.795 1932	.240 124	.160 2532	.881	.816 9079	.560 062	.152 4376
.832	.795 6275	.246 367	.160 0931	.882	.817 3422	.566 625	.152 2852
.833	.796 0618	.252 616	.159 9330	.883	.817 7765	.573 195	.152 1330
.834	.796 4961	.258 872	.159 7732	.884	.818 2108	.579 771	.151 9810
1.835	0.796 9304	6.265 134	0.159 6135	1.885	0.818 6451	6.586 354	0.151 8291
.836	.797 3647	.271 402	.159 4540	.886	.819 0794	.592 914	.151 6773
.837	.797 7990	.277 677	.159 2946	.887	.819 5137	.599 540	.151 5257
.838	.798 2333	.283 958	.159 1354	.888	.819 9480	.606 143	.151 3743
.839	.798 6676	.290 245	.158 9763	.889	.820 3823	.612 753	.151 2230
1.840	0.799 1018	6.296 538	0.158 8174	1.890	0.820 8166	6.619 369	0.151 0718
.841	.799 5361	.302 838	.158 6587	.891	.821 2509	.625 991	.150 9208
.842	.799 9704	.309 144	.158 5001	.892	.821 6852	.632 621	.150 7700
.843	.800 4047	.315 455	.158 3417	.893	.822 1195	.639 257	.150 6193
.844	.800 8390	.321 775	.158 1834	.894	.822 5537	.645 899	.150 4687
1.845	0.801 2733	6.328 100	0.158 0253	1.895	0.822 9880	6.652 548	0.150 3183
.846	.801 7076	.334 431	.157 8674	.896	.823 4223	.659 204	.150 1681
.847	.802 1419	.340 769	.157 7096	.897	.823 8566	.665 867	.150 0180
.848	.802 5762	.347 113	.157 5520	.898	.824 2909	.672 536	.149 8681
.849	.803 0105	.353 463	.157 3945	.899	.824 7252	.679 212	.149 7183
1.850	0.803 4448	6.359 820	0.157 2372	1.900	0.825 1595	6.685 894	0.149 5686
	$\log_{10}(e^u)$	$e^u$	$e^{-u}$		$\log_{10}(e^u)$	$e^u$	$e^{-u}$

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# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
1.000	0.845 1505	6.685 894	0.149 5686	1.950	0.846 8742	7.028 688	0.142 2741
.001	.845 5038	.692 581	.149 4191	.951	.847 3085	.035 730	.142 1319
.002	.846 0281	.693 280	.149 2698	.952	.847 7428	.042 759	.141 9808
.003	.846 4624	.705 982	.149 1206	.953	.848 1771	.049 805	.141 8479
.004	.846 8967	.712 692	.148 9715	.954	.848 6114	.056 859	.141 7061
1.005	0.847 3310	6.719 408	0.148 8226	1.955	0.849 0457	7.063 919	0.141 5645
.006	.847 7653	.736 130	.148 6739	.956	.849 4800	.070 983	.141 4230
.007	.848 1996	.732 860	.148 5253	.957	.849 9143	.078 061	.141 2816
.008	.848 6339	.739 596	.148 3768	.958	.850 3486	.085 143	.141 1404
.009	.849 0682	.746 330	.148 2285	.959	.850 7829	.092 231	.140 9993
1.010	0.849 5025	6.753 089	0.148 0804	1.960	0.851 2172	7.099 327	0.140 8584
.011	.849 9368	.759 845	.147 9321	.961	.851 6515	.106 430	.140 7176
.012	.850 3710	.766 608	.147 7845	.962	.852 0858	.113 540	.140 5770
.013	.850 8053	.773 378	.147 6368	.963	.852 5201	.120 657	.140 4365
.014	.851 2396	.780 155	.147 4892	.964	.852 9544	.127 781	.140 2961
1.015	0.851 6739	6.785 939	0.147 3418	1.965	0.853 3887	7.134 913	0.140 1559
.016	.852 1082	.793 729	.147 1946	.966	.853 8230	.142 051	.140 0158
.017	.852 5425	.800 526	.147 0471	.967	.854 2572	.149 197	.139 8759
.018	.852 9768	.807 330	.146 9005	.968	.854 6915	.156 349	.139 7360
.019	.853 4111	.814 141	.146 7536	.969	.855 1258	.163 509	.139 5964
1.020	0.853 8454	6.820 958	0.146 6070	1.970	0.855 5601	7.170 676	0.139 4569
.021	.854 2797	.827 783	.146 4601	.971	.855 9944	.177 851	.139 3175
.022	.854 7140	.834 614	.146 3140	.972	.856 4287	.185 032	.139 1782
.023	.855 1483	.841 452	.146 1678	.973	.856 8630	.192 221	.139 0391
.024	.855 5825	.848 297	.146 0217	.974	.857 2973	.199 417	.138 9001
1.025	0.856 0169	6.855 149	0.145 8758	1.975	0.857 7316	7.206 620	0.138 7613
.026	.856 4512	.862 007	.145 7300	.976	.858 1659	.213 830	.138 6226
.027	.856 8855	.868 873	.145 5843	.977	.858 6002	.221 017	.138 4841
.028	.857 3198	.875 745	.145 4388	.978	.859 0345	.228 272	.138 3457
.029	.857 7541	.882 624	.145 2934	.979	.859 4688	.235 504	.138 2074
1.030	0.858 1884	6.889 510	0.145 1482	1.980	0.859 9031	7.242 743	0.138 0692
.031	.858 6226	.889 403	.145 0031	.981	.860 3374	.249 089	.137 9312
.032	.859 0569	.896 303	.144 8582	.982	.860 7717	.257 243	.137 7934
.033	.859 4912	.903 210	.144 7134	.983	.861 2060	.264 504	.137 6557
.034	.859 9255	.910 123	.144 5688	.984	.861 6403	.271 772	.137 5181
1.035	0.860 3598	6.924 044	0.144 4243	1.985	0.862 0745	7.279 047	0.137 3806
.036	.860 7941	.920 972	.144 2799	.986	.862 5088	.286 330	.137 2433
.037	.861 2284	.927 905	.144 1357	.987	.862 9431	.293 620	.137 1061
.038	.861 6627	.934 847	.143 9916	.988	.863 3774	.300 917	.136 9691
.039	.862 0970	.941 796	.143 8477	.989	.863 8117	.308 222	.136 8322
1.040	0.862 5313	6.958 751	0.143 7039	1.990	0.864 2460	7.315 534	0.136 6954
.041	.862 9656	.948 713	.143 5603	.991	.864 6803	.322 853	.136 5588
.042	.863 3999	.955 682	.143 4168	.992	.865 1146	.330 179	.136 4223
.043	.863 8342	.962 659	.143 2735	.993	.865 5489	.337 513	.136 2860
.044	.864 2685	.969 642	.143 1303	.994	.865 9832	.344 854	.136 1497
1.045	0.864 7028	6.993 632	0.142 9872	1.995	0.866 4175	7.352 203	0.136 0137
.046	.865 1371	.976 629	.142 8443	.996	.866 8518	.359 559	.135 8777
.047	.865 5714	.983 633	.142 7015	.997	.867 2861	.366 922	.135 7419
.048	.866 0057	.990 641	.142 5589	.998	.867 7204	.374 293	.135 6062
.049	.866 4399	.997 662	.142 4164	.999	.868 1547	.381 671	.135 4707
1.050	0.866 8742	7.028 688	0.142 2741	2.000	0.868 5890	7.389 056	0.135 3353
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
2.000	0.868 5890	7.389 056	0.135 3353	2.050	0.800 3037	7.767 901	0.131 7349
.001	.879 0233	.390 449	.135 3000	.051	.800 7383	.775 073	.131 6062
.002	.890 1576	.403 819	.135 0619	.052	.801 1733	.783 452	.131 4777
.003	.899 8918	.411 257	.131 9299	.053	.801 6066	.791 240	.131 3493
.004	.870 3261	.418 672	.131 7950	.054	.802 0400	.799 035	.131 2210
2.005	0.870 7601	7.426 091	0.131 6603	2.055	0.802 4752	7.806 838	0.131 0928
.005	.871 1947	.433 521	.131 5257	.055	.802 9095	.811 649	.130 9648
.007	.871 6290	.440 951	.131 3912	.057	.803 3437	.822 477	.130 8369
.008	.872 0633	.448 406	.131 2569	.058	.803 7780	.830 301	.130 7091
.009	.872 4976	.455 858	.131 1227	.059	.804 2123	.838 128	.130 5815
2.010	0.872 9319	7.463 317	0.133 9887	2.060	0.804 6466	7.845 970	0.130 4540
.011	.873 3662	.470 281	.133 8548	.061	.805 0809	.843 820	.130 3266
.012	.873 8005	.478 259	.131 7210	.062	.805 5152	.851 677	.130 1993
.013	.874 2348	.485 711	.133 5873	.063	.805 9495	.859 513	.130 0722
.014	.874 6691	.493 230	.133 4538	.064	.806 3838	.867 347	.130 9452
2.015	0.875 1034	7.500 727	0.133 3201	2.065	0.806 8181	7.883 208	0.130 8183
.016	.875 5377	.508 233	.133 1871	.065	.807 2524	.873 077	.130 6915
.017	.875 9720	.515 741	.133 0540	.067	.807 6867	.881 681	.130 5649
.018	.876 4063	.523 263	.132 9210	.068	.808 1210	.890 086	.130 4381
.019	.876 8406	.530 790	.132 7882	.069	.808 5553	.898 001	.130 3120
2.020	0.877 2749	7.538 325	0.132 6555	2.070	0.808 9896	7.921 843	0.130 1858
.021	.877 7091	.545 857	.132 5229	.071	.809 4239	.933 752	.130 0597
.022	.878 1434	.553 417	.132 3901	.072	.809 8582	.941 656	.130 9337
.023	.878 5777	.560 971	.132 2581	.073	.810 2925	.949 633	.130 8078
.024	.879 0120	.568 539	.132 1259	.074	.810 7268	.956 586	.130 6820
2.025	0.879 4463	7.576 111	0.131 9938	2.075	0.811 1610	7.961 546	0.130 5561
.026	.879 8806	.583 691	.131 8619	.075	.811 5953	.962 515	.130 4309
.027	.880 3149	.591 278	.131 7301	.077	.812 0295	.970 401	.130 3056
.028	.880 7492	.598 873	.131 5985	.078	.812 4639	.978 476	.130 1803
.029	.881 1835	.606 470	.131 4669	.079	.812 8982	.986 468	.130 0552
2.030	0.881 6178	7.614 086	0.131 3355	2.080	0.813 3325	8.001 469	0.130 9302
.031	.882 0521	.621 704	.131 2043	.081	.813 7668	.993 477	.130 8053
.032	.882 4864	.629 330	.131 0731	.082	.814 2011	.999 491	.130 6805
.033	.882 9207	.636 951	.130 9421	.083	.814 6354	.998 518	.130 5560
.034	.883 3550	.644 601	.130 8112	.084	.815 0697	.996 551	.130 4315
2.035	0.883 7893	7.652 252	0.130 6805	2.085	0.815 5040	8.014 591	0.130 3071
.036	.884 2236	.659 908	.130 5499	.085	.815 9383	.993 630	.130 1829
.037	.884 6579	.667 572	.130 4194	.087	.816 3726	.999 667	.130 0588
.038	.885 0922	.675 243	.130 2890	.088	.816 8069	.998 701	.130 9348
.039	.885 5264	.682 923	.130 1588	.089	.817 2412	.996 841	.130 8109
2.040	0.885 9607	7.690 609	0.130 0287	2.090	0.817 6755	8.031 915	0.130 6871
.041	.886 3950	.698 301	.129 8987	.091	.818 1098	.993 001	.130 5635
.042	.886 8293	.706 009	.129 7689	.092	.818 5441	.999 101	.130 4400
.043	.887 2636	.713 716	.129 6392	.094	.818 9784	.999 206	.130 3166
.044	.887 6979	.721 433	.129 5096	.094	.819 4127	.997 320	.130 1934
2.045	0.888 1322	7.729 159	0.129 3792	2.095	0.819 8469	8.135 441	0.130 0702
.046	.888 5665	.736 892	.129 2500	.095	.820 2812	.993 570	.130 9472
.047	.889 0008	.744 632	.129 1217	.097	.820 7155	.999 708	.130 8243
.048	.889 4351	.752 381	.128 9926	.098	.821 1498	.999 853	.130 7016
.049	.889 8694	.760 137	.128 8637	.099	.821 5841	.998 003	.130 5789
2.050	0.890 3037	7.767 901	0.128 7349	2.100	0.822 0184	8.166 170	0.130 4561
$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
2.100	0.912 0181	8.166 170	0.122 4564	2.150	0.933 7331	8.584 858	0.116 4812
.101	.912 4527	.174 340	.122 3340	.151	.934 1674	.593 448	.116 3677
.102	.912 8870	.182 519	.122 2118	.152	.934 6017	.602 045	.116 2514
.103	.913 3213	.190 705	.122 0896	.153	.935 0360	.610 652	.116 1352
.104	.913 7556	.198 900	.121 9676	.154	.935 4703	.619 267	.116 0192
2.105	0.914 1899	8.207 103	0.121 8457	2.155	0.935 9046	8.627 890	0.115 9032
.106	.914 6242	.215 314	.121 7239	.156	.936 3389	.636 522	.115 7873
.107	.915 0585	.223 531	.121 6022	.157	.936 7732	.645 163	.115 6716
.108	.915 4928	.231 761	.121 4807	.158	.937 2075	.653 813	.115 5560
.109	.915 9271	.239 997	.121 3593	.159	.937 6418	.662 471	.115 4405
2.110	0.916 3614	8.248 241	0.121 2380	2.160	0.938 0761	8.671 138	0.115 3251
.111	.916 7957	.250 494	.121 1168	.161	.938 5104	.679 813	.115 2099
.112	.917 2300	.264 754	.120 9957	.162	.938 9447	.688 497	.115 0947
.113	.917 6643	.273 023	.120 8748	.163	.939 3790	.697 190	.114 9797
.114	.918 0985	.281 300	.120 7540	.164	.939 8133	.705 892	.114 8647
2.115	0.918 5328	8.289 585	0.120 6333	2.165	0.940 2476	8.714 602	0.114 7499
.116	.918 9671	.297 879	.120 5127	.166	.940 6818	.723 321	.114 6352
.117	.919 4014	.306 184	.120 3923	.167	.941 1161	.732 049	.114 5207
.118	.919 8357	.314 492	.120 2719	.168	.941 5504	.740 785	.114 4062
.119	.920 2700	.322 811	.120 1517	.169	.941 9847	.749 530	.114 2919
2.120	0.920 7043	8.331 137	0.120 0316	2.170	0.942 4190	8.758 284	0.114 1776
.121	.921 1386	.339 473	.119 9117	.171	.942 8533	.767 017	.114 0635
.122	.921 5729	.347 816	.119 7918	.172	.943 2876	.775 818	.113 9495
.123	.922 0072	.356 168	.119 6721	.173	.943 7219	.784 598	.113 8356
.124	.922 4415	.364 529	.119 5525	.174	.944 1562	.793 387	.113 7218
2.125	0.922 8758	8.372 897	0.119 4330	2.175	0.944 5905	8.802 185	0.113 6082
.126	.923 3101	.381 275	.119 3136	.176	.945 0248	.810 992	.113 4946
.127	.923 7444	.389 660	.119 1943	.177	.945 4591	.819 807	.113 3812
.128	.924 1787	.398 054	.119 0752	.178	.945 8934	.828 631	.113 2678
.129	.924 6130	.406 456	.118 9562	.179	.946 3277	.837 464	.113 1546
2.130	0.925 0474	8.414 867	0.118 8373	2.180	0.946 7620	8.846 366	0.113 0415
.131	.925 4815	.423 286	.118 7185	.181	.947 1963	.855 157	.112 9285
.132	.925 9158	.431 713	.118 5999	.182	.947 6306	.864 017	.112 8157
.133	.926 3501	.440 149	.118 4813	.183	.948 0649	.872 885	.112 7029
.134	.926 7844	.448 594	.118 3629	.184	.948 4991	.881 762	.112 5903
2.135	0.927 2187	8.457 047	0.118 2446	2.185	0.948 9334	8.890 649	0.112 4777
.136	.927 6530	.465 568	.118 1261	.186	.949 3677	.899 544	.112 3653
.137	.928 0873	.473 978	.118 0083	.187	.949 8020	.908 448	.112 2530
.138	.928 5216	.482 456	.117 8904	.188	.950 2363	.917 361	.112 1408
.139	.928 9559	.490 942	.117 7726	.189	.950 6706	.926 282	.112 0287
2.140	0.929 3902	8.499 438	0.117 6548	2.190	0.951 1049	8.935 213	0.111 9167
.141	.929 8245	.507 941	.117 5372	.191	.951 5392	.944 153	.111 8049
.142	.930 2588	.516 454	.117 4198	.192	.951 9735	.953 101	.111 6931
.143	.930 6931	.524 974	.117 3024	.193	.952 4078	.962 059	.111 5815
.144	.931 1274	.533 503	.117 1852	.194	.952 8421	.971 026	.111 4700
2.145	0.931 5617	8.542 041	0.117 0680	2.195	0.953 2764	8.980 001	0.111 3586
.146	.931 9960	.550 588	.116 9510	.196	.953 7107	.988 986	.111 2473
.147	.932 4303	.559 144	.116 8341	.197	.954 1450	.997 970	.111 1361
.148	.932 8645	.567 706	.116 7171	.198	.954 5793	9.005 982	.111 0250
.149	.933 2988	.576 278	.116 6007	.199	.955 0136	.015 993	.110 9140
2.150	0.933 7331	8.584 858	0.116 4842	2.200	0.955 4479	9.025 013	0.110 8032
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$



# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
2.200	0.955 4170	9.025 013	0.110 8032	2.250	0.977 1626	9.487 736	0.105 3092
.201	.955 8822	.034 043	.110 1024	.251	.977 5980	.497 238	.005 2930
.202	.956 3464	.043 082	.110 5818	.252	.978 0302	.500 730	.005 1886
.203	.956 7507	.052 120	.110 4712	.253	.978 4653	.510 212	.005 0835
.204	.957 1850	.061 180	.110 3608	.254	.978 8998	.525 703	.004 9785
2.205	0.957 6093	9.070 252	0.110 2505	2.255	0.979 3311	0.535 203	0.104 8735
.206	.958 0536	.070 326	.110 1403	.256	.979 7684	.544 833	.004 7687
.207	.958 4979	.083 410	.110 0302	.257	.980 2030	.554 383	.004 6640
.208	.958 9222	.097 503	.109 9203	.258	.980 6360	.563 912	.004 5594
.209	.959 3565	.106 605	.109 8104	.259	.981 0712	.573 511	.004 4549
2.210	0.959 7908	9.115 716	0.109 7006	2.260	0.981 5055	0.583 084	0.104 3505
.211	.960 2251	.124 837	.109 5910	.261	.981 9368	.592 627	.004 3462
.212	.960 6594	.133 936	.109 4815	.262	.982 3711	.602 375	.004 2420
.213	.961 0937	.143 105	.109 3720	.263	.982 8034	.611 882	.004 1379
.214	.961 5280	.152 252	.109 2627	.264	.983 2347	.621 498	.004 0339
2.215	0.961 9623	9.161 400	0.109 1535	2.265	0.983 6770	0.631 125	0.103 8300
.216	.962 3966	.170 575	.109 0444	.266	.984 1113	.640 761	.003 7253
.217	.962 8309	.179 750	.108 9351	.267	.984 5456	.650 406	.003 6226
.218	.963 2652	.188 935	.108 8265	.268	.984 9799	.660 061	.003 5190
.219	.963 6995	.198 128	.108 7178	.269	.985 4142	.669 736	.003 4155
2.220	0.964 1337	9.207 331	0.108 6091	2.270	0.985 8485	0.679 401	0.103 3122
.221	.964 5680	.216 543	.108 5006	.271	.986 2838	.689 085	.003 3080
.222	.965 0023	.225 764	.108 3921	.272	.986 7171	.698 779	.003 2038
.223	.965 4366	.234 991	.108 2838	.273	.987 1514	.708 483	.003 1007
.224	.965 8709	.244 234	.108 1755	.274	.987 5857	.718 196	.003 0008
2.225	0.966 3052	9.253 483	0.108 0674	2.275	0.988 0190	0.727 910	0.103 7069
.226	.966 7395	.262 741	.107 9591	.276	.988 4532	.737 632	.003 6012
.227	.967 1738	.272 008	.107 8515	.277	.988 8875	.747 391	.003 5015
.228	.967 6081	.281 285	.107 7437	.278	.989 3238	.757 147	.003 4030
.229	.968 0424	.290 574	.107 6360	.279	.989 7571	.766 900	.003 3065
2.230	0.968 4767	9.299 866	0.107 5281	2.280	0.990 1914	0.776 680	0.103 3122
.231	.968 9110	.300 171	.107 4210	.281	.990 6257	.786 462	.003 1830
.232	.969 3453	.310 481	.107 3136	.282	.991 0600	.796 253	.003 0798
.233	.969 7796	.320 808	.107 2063	.283	.991 4943	.806 054	.002 9778
.234	.970 2139	.332 140	.107 0992	.284	.991 9286	.815 865	.002 8759
2.235	0.970 6482	9.346 482	0.106 9921	2.285	0.992 3629	0.825 686	0.103 7741
.236	.971 0825	.355 833	.106 8852	.286	.992 7972	.835 517	.002 6743
.237	.971 5168	.365 191	.106 7784	.287	.993 2315	.845 357	.002 5707
.238	.971 9511	.374 563	.106 6716	.288	.993 6658	.855 203	.002 4692
.239	.972 3853	.383 941	.106 5650	.289	.994 1001	.865 053	.002 3678
2.240	0.972 8196	9.393 331	0.106 4585	2.290	0.994 5344	0.874 908	0.103 3665
.241	.973 2539	.402 720	.106 3521	.291	.994 9687	.884 818	.002 2652
.242	.973 6882	.412 137	.106 2458	.292	.995 4030	.894 707	.002 1641
.243	.974 1225	.421 551	.106 1396	.293	.995 8372	.904 602	.002 0631
.244	.974 5568	.430 980	.106 0335	.294	.996 2715	.914 517	.001 9622
2.245	0.974 9911	9.440 416	0.105 9275	2.295	0.996 7058	0.924 436	0.103 7614
.246	.975 4254	.449 861	.105 8217	.296	.997 1401	.934 365	.001 8607
.247	.975 8597	.459 315	.105 7159	.297	.997 5744	.944 305	.001 7601
.248	.976 2940	.468 779	.105 6102	.298	.998 0087	.954 251	.001 6596
.249	.976 7283	.478 253	.105 5047	.299	.998 4430	.964 213	.001 5592
2.250	0.977 1626	9.487 736	0.105 3992	2.300	0.998 8773	0.974 182	0.103 2588
				$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
2.300	0.998 8773	9.074 182	0.100 2588	2.350	1.020 5920	10.485 570	0.095 3692
.301	.009 3116	.981 162	.100 1586	.351	.021 0263	.196 061	.095 2738
.302	.009 7459	.991 151	.100 0585	.352	.021 4606	.506 562	.095 1786
.303	1.000 1802	10.004 150	.099 9585	.353	.021 8949	.517 074	.095 0835
.304	.000 6145	.014 159	.099 8586	.354	.022 3292	.527 595	.094 9884
2.305	1.001 0488	10.024 178	0.099 7588	2.355	1.022 7635	10.538 129	0.094 8935
.306	.001 4831	.034 207	.099 6591	.356	.023 1978	.548 672	.094 7987
.307	.001 9174	.044 217	.099 5595	.357	.023 6321	.559 226	.094 7039
.308	.002 3517	.054 206	.099 4600	.358	.024 0664	.569 791	.094 6093
.309	.002 7860	.064 355	.099 3606	.359	.024 5007	.580 366	.094 5147
2.310	1.003 2203	10.074 425	0.099 2613	2.360	1.024 9350	10.590 951	0.094 4202
.311	.003 6545	.084 504	.099 1620	.361	.025 3693	.601 518	.094 3259
.312	.004 0888	.094 594	.099 0629	.362	.025 8036	.612 155	.094 2316
.313	.004 5231	.104 693	.098 9639	.363	.026 2379	.622 772	.094 1374
.314	.004 9574	.114 803	.098 8650	.364	.026 6722	.633 400	.094 0433
2.315	1.005 3917	10.124 923	0.098 7662	2.365	1.027 1064	10.644 039	0.093 9493
.316	.005 8260	.135 053	.098 6675	.366	.027 5407	.654 688	.093 8554
.317	.006 2603	.145 193	.098 5688	.367	.027 9750	.665 348	.093 7616
.318	.006 6946	.155 343	.098 4703	.368	.028 4093	.676 019	.093 6679
.319	.007 1289	.165 504	.098 3719	.369	.028 8436	.686 700	.093 5743
2.320	1.007 5632	10.175 674	0.098 2736	2.370	1.029 2779	10.697 392	0.093 4807
.321	.007 9975	.185 855	.098 1754	.371	.029 7122	.708 095	.093 3873
.322	.008 4318	.196 046	.098 0772	.372	.030 1465	.718 808	.093 2940
.323	.008 8661	.206 247	.097 9792	.373	.030 5808	.729 533	.093 2007
.324	.009 3004	.216 459	.097 8813	.374	.031 0151	.740 268	.093 1076
2.325	1.009 7347	10.226 680	0.097 7834	2.375	1.031 4494	10.751 013	0.093 0145
.326	.010 1690	.236 912	.097 6857	.376	.031 8837	.761 770	.092 9215
.327	.010 6033	.247 154	.097 5881	.377	.032 3180	.772 537	.092 8286
.328	.011 0376	.257 406	.097 4905	.378	.032 7523	.783 315	.092 7359
.329	.011 4718	.267 669	.097 3931	.379	.033 1866	.794 103	.092 6432
2.330	1.011 9061	10.277 942	0.097 2957	2.380	1.033 6209	10.804 903	0.092 5506
.331	.012 3404	.288 225	.097 1985	.381	.034 0552	.815 713	.092 4581
.332	.012 7747	.298 518	.097 1014	.382	.034 4895	.826 534	.092 3657
.333	.013 2090	.308 822	.097 0043	.383	.034 9238	.837 366	.092 2733
.334	.013 6433	.319 136	.096 9073	.384	.035 3580	.848 209	.092 1811
2.335	1.014 0776	10.329 460	0.096 8105	2.385	1.035 7923	10.859 063	0.092 0890
.336	.014 5119	.339 795	.096 7137	.386	.036 2266	.860 927	.091 9959
.337	.014 9462	.350 140	.096 6171	.387	.036 6609	.880 803	.091 9050
.338	.015 3805	.360 495	.096 5205	.388	.037 0952	.901 689	.091 8131
.339	.015 8148	.370 861	.096 4240	.389	.037 5295	.922 586	.091 7214
2.340	1.016 2491	10.381 237	0.096 3276	2.390	1.037 9638	10.913 494	0.091 6297
.341	.016 6834	.391 623	.096 2314	.391	.038 3981	.924 413	.091 5381
.342	.017 1177	.402 020	.096 1352	.392	.038 8324	.935 343	.091 4466
.343	.017 5520	.412 427	.096 0391	.393	.039 2667	.946 284	.091 3552
.344	.017 9863	.422 845	.095 9431	.394	.039 7010	.957 235	.091 2639
2.345	1.018 4206	10.433 273	0.095 8472	2.395	1.040 1353	10.968 198	0.091 1727
.346	.018 8549	.443 711	.095 7514	.396	.040 5696	.979 172	.091 0816
.347	.019 2891	.454 160	.095 6557	.397	.041 0039	.990 156	.090 9905
.348	.019 7234	.464 620	.095 5601	.398	.041 4382	1.001 152	.090 8996
.349	.020 1577	.475 089	.095 4646	.399	.041 8725	.012 159	.090 8087
2.350	1.020 5920	10.485 570	0.095 3692	2.400	1.042 3068	11.023 176	0.090 7180
$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
2.400	1.012 3068	11.023 176	0.090 7180	2.450	1.061 0215	11.588 317	0.086 2036
.401	.012 7411	.034 205	.090 6273	.451	.061 4558	.509 941	.086 2073
.402	.013 1753	.045 245	.090 5367	.452	.061 8901	.611 547	.086 2121
.403	.013 6096	.056 290	.090 4462	.453	.062 3244	.723 161	.086 0351
.404	.014 0439	.067 357	.090 3558	.454	.062 7587	.834 793	.085 9491
2.405	1.014 4782	11.078 430	0.090 2655	2.455	1.066 1930	11.646 434	0.085 8632
.406	.014 9125	.069 514	.090 1753	.456	.066 6273	.958 680	.085 7774
.407	.015 3468	.100 609	.090 0851	.457	.067 0615	1.079 730	.085 6916
.408	.015 7811	.111 715	.089 9951	.458	.067 4958	1.201 425	.085 6060
.409	.016 2154	.122 833	.089 9052	.459	.067 9301	1.323 113	.085 5204
2.410	1.016 6497	11.133 961	0.089 8153	2.470	1.068 3644	11.764 812	0.085 4350
.411	.017 0840	.145 101	.089 7255	.461	.068 7987	1.446 522	.085 3496
.412	.017 5183	.156 251	.089 6358	.462	.069 2330	1.568 218	.085 2643
.413	.017 9526	.167 413	.089 5463	.463	.069 6673	1.689 920	.085 1790
.414	.018 3869	.178 580	.089 4568	.464	.070 1016	1.811 625	.085 0939
2.415	1.018 8212	11.189 770	0.089 3673	2.465	1.070 5359	11.764 812	0.085 0088
.416	.019 2555	.200 966	.089 2776	.466	.070 9702	1.933 352	.084 9239
.417	.019 6898	.212 173	.089 1888	.467	.071 4045	2.055 043	.084 8390
.418	.020 1241	.223 300	.089 0990	.468	.071 8388	2.176 730	.084 7542
.419	.020 5584	.234 610	.089 0106	.469	.072 2731	2.298 420	.084 6695
2.420	1.020 9926	11.245 859	0.088 9216	2.470	1.072 7074	11.821 417	0.084 5849
.421	.021 4269	.257 111	.088 8327	.471	.073 1417	2.419 117	.084 5003
.422	.021 8612	.268 374	.088 7431	.472	.073 5760	2.540 813	.084 4159
.423	.022 2955	.279 648	.088 6534	.473	.074 0103	2.662 507	.084 3315
.424	.022 7298	.290 933	.088 5636	.474	.074 4445	2.784 200	.084 2472
2.425	1.023 4641	11.302 330	0.088 4731	2.475	1.074 8788	11.881 907	0.084 1630
.426	.023 8584	.313 537	.088 3839	.476	.075 3131	2.905 895	.084 0789
.427	.024 2527	.324 857	.088 2943	.477	.075 7474	3.027 680	.084 0048
.428	.024 6470	.336 187	.088 2047	.478	.076 1817	3.149 465	.083 9200
.429	.025 0413	.347 529	.088 1149	.479	.076 6160	3.271 250	.083 8352
2.430	1.025 8986	11.358 882	0.088 0248	2.480	1.077 0503	11.941 361	0.083 7503
.431	.025 4929	.370 242	.087 9348	.481	.077 4846	3.393 035	.083 6658
.432	.025 9272	.381 633	.087 8449	.482	.077 9189	3.514 810	.083 5813
.433	.026 3615	.393 010	.087 7550	.483	.078 3532	3.636 585	.083 4968
.434	.026 7958	.404 409	.087 6651	.484	.078 7875	3.758 360	.083 4123
2.435	1.027 7571	11.415 819	0.087 5752	2.485	1.077 5218	12.001 120	0.083 3276
.436	.027 1914	.427 340	.087 4853	.486	.079 0161	3.879 137	.083 2431
.437	.027 6257	.438 673	.087 3954	.487	.079 4504	4.000 912	.083 1586
.438	.028 0600	.450 118	.087 3055	.488	.079 8847	4.122 687	.083 0741
.439	.028 4943	.461 573	.087 2156	.489	.080 3190	4.244 462	.082 9896
2.440	1.029 7285	11.473 011	0.087 1257	2.490	1.081 3033	12.061 276	0.082 9050
.441	.029 1228	.481 530	.087 0358	.491	.081 7376	4.366 243	.082 8205
.442	.029 5571	.493 010	.086 9459	.492	.082 1719	4.488 018	.082 7360
.443	.029 9914	.504 512	.086 8560	.493	.082 6062	4.609 793	.082 6515
.444	.030 4257	.516 025	.086 7661	.494	.083 0405	4.731 568	.082 5670
2.445	1.030 8500	11.530 550	0.086 6762	2.495	1.083 5647	12.121 734	0.082 4825
.446	.030 8543	.512 086	.086 5863	.496	.083 9990	4.853 339	.082 3980
.447	.031 2886	.523 631	.086 4964	.497	.084 4333	4.975 114	.082 3135
.448	.031 7229	.535 193	.086 4065	.498	.084 8676	5.096 889	.082 2290
.449	.032 1572	.546 764	.086 3166	.499	.085 3019	5.218 664	.082 1445
	1.061 0215	11.588 317	0.086 2936	2.500	1.085 7362	12.182 494	0.082 0600
		$e^n$	$e^{-n}$		$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$
							$e^{-n}$

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
2.500	1.085 7362	12.182 491	0.082 0850	2.550	1.107 4509	12.807 104	0.078 0817
.501	.086 1705	.194 683	.082 0030	.551	.107 8852	.819 917	.078 0036
.502	.086 6048	.205 883	.081 9210	.552	.108 3195	.832 744	.077 9257
.503	.087 0391	.219 096	.081 8391	.553	.108 7538	.845 583	.077 8478
.504	.087 4734	.231 322	.081 7573	.554	.109 1881	.858 435	.077 7700
2.505	1.087 9077	12.243 559	0.081 6756	2.555	1.109 6221	12.871 300	0.077 6922
.506	.088 3420	.255 809	.081 5940	.556	.110 0567	.884 177	.077 6146
.507	.088 7763	.268 071	.081 5124	.557	.110 4910	.897 068	.077 5370
.508	.089 2105	.280 345	.081 4309	.558	.110 9253	.909 972	.077 4595
.509	.089 6449	.292 631	.081 3495	.559	.111 3596	.922 888	.077 3821
2.510	1.090 0791	12.304 930	0.081 2682	2.560	1.111 7939	12.935 817	0.077 3047
.511	.090 5134	.317 241	.081 1870	.561	.112 2282	.948 760	.077 2275
.512	.090 9477	.329 565	.081 1059	.562	.112 6625	.961 715	.077 1503
.513	.091 3820	.341 900	.081 0248	.563	.113 0968	.974 683	.077 0732
.514	.091 8163	.354 248	.080 9438	.564	.113 5311	.987 664	.076 9961
2.515	1.092 2506	12.366 609	0.080 8629	2.565	1.113 9653	13.000 658	0.076 9192
.516	.092 6849	.378 982	.080 7821	.566	.114 3996	.013 666	.076 8423
.517	.093 1192	.391 307	.080 7013	.567	.114 8339	.026 685	.076 7655
.518	.093 5535	.403 764	.080 6207	.568	.115 2682	.039 719	.076 6888
.519	.093 9878	.416 174	.080 5401	.569	.115 7025	.052 765	.076 6121
2.520	1.094 4221	12.428 597	0.080 4596	2.570	1.116 1368	13.065 824	0.076 5355
.521	.094 8564	.441 032	.080 3792	.571	.116 5711	.078 897	.076 4590
.522	.095 2907	.453 479	.080 2988	.572	.117 0054	.091 982	.076 3826
.523	.095 7250	.465 938	.080 2185	.573	.117 4397	.105 081	.076 3063
.524	.096 1593	.478 411	.080 1384	.574	.117 8740	.118 192	.076 2300
2.525	1.096 5936	12.490 895	0.080 0583	2.575	1.118 3083	13.131 317	0.076 1538
.526	.097 0279	.503 392	.079 9783	.576	.118 7426	.144 455	.076 0777
.527	.097 4622	.515 902	.079 8984	.577	.119 1769	.157 606	.076 0017
.528	.097 8965	.528 424	.079 8185	.578	.119 6112	.170 770	.075 9257
.529	.098 3307	.540 959	.079 7387	.579	.120 0455	.183 948	.075 8498
2.530	1.098 7650	12.553 506	0.079 6590	2.580	1.120 4798	13.197 138	0.075 7740
.531	.099 1993	.566 056	.079 5791	.581	.120 9141	.210 342	.075 6983
.532	.099 6336	.578 638	.079 4999	.582	.121 3484	.223 559	.075 6225
.533	.100 0679	.591 223	.079 4201	.583	.121 7826	.236 789	.075 5470
.534	.100 5022	.603 821	.079 3410	.584	.122 2169	.250 032	.075 4715
2.535	1.100 9365	12.616 431	0.079 2617	2.585	1.122 6512	13.263 289	0.075 3961
.536	.101 3708	.629 054	.079 1825	.586	.123 0855	.276 559	.075 3207
.537	.101 8051	.641 689	.079 1031	.587	.123 5198	.289 842	.075 2454
.538	.102 2394	.654 337	.079 0243	.588	.123 9541	.303 139	.075 1702
.539	.102 6737	.666 993	.078 9453	.589	.124 3884	.316 449	.075 0951
2.540	1.103 1080	12.679 671	0.078 8664	2.590	1.124 8227	13.329 772	0.075 0200
.541	.103 5423	.692 357	.078 7876	.591	.125 2570	.343 108	.074 9451
.542	.103 9766	.705 056	.078 7088	.592	.125 6913	.356 458	.074 8701
.543	.104 4109	.717 767	.078 6302	.593	.126 1256	.369 821	.074 7953
.544	.104 8452	.730 491	.078 5516	.594	.126 5599	.383 193	.074 7206
2.545	1.105 2795	12.743 228	0.078 4731	2.595	1.126 9942	13.396 587	0.074 6459
.546	.105 7138	.755 978	.078 3946	.596	.127 4285	.409 991	.074 5713
.547	.106 1480	.768 740	.078 3163	.597	.127 8628	.423 407	.074 4967
.548	.106 5823	.781 515	.078 2380	.598	.128 2971	.436 838	.074 4223
.549	.107 0166	.794 303	.078 1598	.599	.128 7314	.450 281	.074 3479
2.550	1.107 4509	12.807 104	0.078 0817	2.600	1.129 1657	13.463 738	0.074 2736
$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$

The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
2.600	1.129 1657	13.463 738	0.074 2736	2.650	1.150 8804	14.154 039	0.070 6512
.601	.129 5969	.477 208	.074 1993	.651	.151 3147	.168 200	.070 5806
.602	.130 0342	.490 692	.074 1252	.652	.151 7490	.182 375	.070 5101
.603	.130 4685	.504 190	.074 0511	.653	.152 1833	.196 595	.070 4396
.604	.130 9028	.517 701	.073 9771	.654	.152 6176	.210 768	.070 3692
2.605	1.131 3371	13.531 225	0.073 9031	2.655	1.153 0518	14.224 986	0.070 2988
.606	.131 7714	.544 763	.073 8293	.656	.153 4861	.239 218	.070 2285
.607	.132 2057	.558 315	.073 7555	.657	.153 9204	.253 464	.070 1584
.608	.132 6400	.571 886	.073 6818	.658	.154 3547	.267 725	.070 0883
.609	.133 0743	.585 459	.073 6081	.659	.154 7890	.282 000	.070 0182
2.610	1.133 5086	13.599 051	0.073 5345	2.660	1.155 2233	14.296 289	0.069 9482
.611	.133 9429	.612 657	.073 4610	.661	.155 6576	.310 593	.069 8783
.612	.134 3772	.626 275	.073 3876	.662	.156 0919	.324 910	.069 8085
.613	.134 8115	.639 909	.073 3143	.663	.156 5262	.339 242	.069 7387
.614	.135 2458	.653 556	.073 2410	.664	.156 9605	.353 589	.069 6690
2.615	1.135 6801	13.667 216	0.073 1678	2.665	1.157 3948	14.367 950	0.069 5994
.616	.136 1144	.680 850	.073 0947	.666	.157 8291	.382 325	.069 5298
.617	.136 5487	.694 578	.073 0216	.667	.158 2634	.396 714	.069 4603
.618	.136 9830	.708 280	.072 9485	.668	.158 6977	.411 118	.069 3909
.619	.137 4172	.721 995	.072 8757	.669	.159 1320	.425 536	.069 3215
2.620	1.137 8515	13.735 724	0.072 8029	2.670	1.159 5663	14.439 969	0.069 2522
.621	.138 2858	.749 490	.072 7301	.671	.160 0006	.451 416	.069 1830
.622	.138 7201	.763 222	.072 6574	.672	.160 4349	.468 878	.069 1139
.623	.139 1544	.776 993	.072 5848	.673	.160 8692	.483 354	.069 0448
.624	.139 5887	.790 776	.072 5122	.674	.161 3034	.497 845	.068 9758
2.625	1.140 0230	13.804 574	0.072 4398	2.675	1.161 7377	14.513 350	0.068 9068
.626	.140 4572	.818 385	.072 3674	.676	.162 1720	.526 869	.068 8380
.627	.140 8916	.832 211	.072 2950	.677	.162 6063	.541 404	.068 7692
.628	.141 3259	.846 050	.072 2228	.678	.163 0406	.555 952	.068 7001
.629	.141 7602	.859 903	.072 1506	.679	.163 4749	.570 515	.068 6318
2.630	1.142 1945	13.873 770	0.072 0785	2.680	1.163 9092	14.585 093	0.068 5632
.631	.142 6288	.887 651	.072 0064	.681	.164 3435	.590 680	.068 4946
.632	.143 0631	.901 545	.071 9344	.682	.164 7778	.614 293	.068 4262
.633	.143 4974	.915 454	.071 8626	.683	.165 2121	.628 914	.068 3578
.634	.143 9317	.929 376	.071 7907	.684	.165 6464	.643 550	.068 2894
2.635	1.144 3660	13.943 312	0.071 7190	2.685	1.165 0807	14.658 201	0.068 2212
.636	.144 8003	.957 293	.071 6473	.686	.166 5150	.672 867	.068 1530
.637	.145 2345	.971 227	.071 5757	.687	.166 9493	.687 547	.068 0849
.638	.145 6688	.985 205	.071 5041	.688	.167 3836	.702 242	.068 0168
.639	.146 1031	.999 197	.071 4327	.689	.167 8179	.716 952	.067 9489
2.640	1.146 5374	14.013 204	0.071 3613	2.690	1.168 2522	14.731 676	0.067 8809
.641	.146 9717	.027 224	.071 2899	.691	.168 6865	.746 415	.067 8131
.642	.147 4050	.041 258	.071 2187	.692	.169 1207	.761 169	.067 7453
.643	.147 8403	.055 306	.071 1475	.693	.169 5550	.775 937	.067 6775
.644	.148 2746	.069 369	.071 0764	.694	.169 9893	.790 721	.067 6100
2.645	1.148 7089	14.083 445	0.071 0054	2.695	1.170 4236	14.805 519	0.067 5424
.646	.149 1432	.097 536	.070 9344	.696	.170 8579	.820 332	.067 4749
.647	.149 5775	.111 640	.070 8635	.697	.171 2922	.835 159	.067 4074
.648	.150 0118	.125 759	.070 7927	.698	.171 7265	.850 002	.067 3401
.649	.150 4461	.139 892	.070 7219	.699	.172 1608	.864 859	.067 2728
2.650	1.150 8804	14.154 039	0.070 6512	2.700	1.172 5951	14.879 732	0.067 2055
$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
2.700	1.172 5951	14.879 732	0.067 2055	2.750	1.194 3098	15.612 632	0.063 9279
.701	.173 0394	.894 619	.067 1383	.751	.194 7441	.658 282	.063 8340
.702	.173 4637	.900 521	.067 0712	.752	.195 1784	.663 948	.063 8001
.703	.173 8880	.904 438	.067 0042	.753	.195 6127	.669 630	.063 7664
.704	.174 3123	.909 370	.066 9372	.754	.196 0470	.675 328	.063 7327
2.705	1.174 7665	14.954 317	0.066 8703	2.755	1.196 4813	15.721 041	0.063 6990
.706	.175 2009	.909 278	.066 8035	.756	.196 9156	.730 770	.063 5454
.707	.175 6352	.914 255	.066 7367	.757	.197 3499	.732 514	.063 4819
.708	.176 0695	.909 247	.066 6700	.758	.197 7842	.768 275	.063 4185
.709	.176 5038	15.014 254	.066 6039	.759	.198 2185	.784 051	.063 3551
2.710	1.176 9380	15.029 275	0.066 5368	2.760	1.198 6528	15.799 843	0.063 2918
.711	.177 3723	.944 312	.066 4703	.761	.199 0871	.815 051	.063 2285
.712	.177 8066	.959 361	.066 4039	.762	.199 5214	.831 474	.063 1653
.713	.178 2409	.974 431	.066 3375	.763	.199 9557	.847 314	.063 1022
.714	.178 6752	.989 513	.066 2712	.764	.200 3899	.863 169	.063 0391
2.715	1.179 1095	15.104 610	0.066 2050	2.765	1.200 8242	15.879 040	0.062 9761
.716	.179 5438	.119 722	.066 1388	.766	.201 2585	.894 927	.062 9132
.717	.179 9781	.134 850	.066 0727	.767	.201 6928	.910 830	.062 8503
.718	.180 4124	.149 992	.066 0066	.768	.202 1271	.926 749	.062 7875
.719	.180 8467	.165 149	.065 9407	.769	.202 5614	.942 683	.062 7247
2.720	1.181 2810	15.180 322	0.065 8748	2.770	1.202 9957	15.958 634	0.062 6620
.721	.181 7153	.195 510	.065 8089	.771	.203 4300	.974 601	.062 5994
.722	.182 1496	.210 713	.065 7431	.772	.203 8643	.990 583	.062 5368
.723	.182 5839	.225 932	.065 6774	.773	.204 2986	16.006 582	.062 4743
.724	.183 0182	.241 165	.065 6118	.774	.204 7329	.022 596	.062 4119
2.725	1.183 4525	15.256 414	0.065 5462	2.775	1.205 1672	16.038 627	0.062 3495
.726	.183 8868	.271 678	.065 4807	.776	.205 6015	.054 674	.062 2872
.727	.184 3211	.286 957	.065 4152	.777	.206 0358	.070 736	.062 2249
.728	.184 7553	.302 252	.065 3499	.778	.206 4701	.086 815	.062 1627
.729	.185 1896	.317 562	.065 2845	.779	.206 9044	.102 910	.062 1006
2.730	1.185 6239	15.332 887	0.065 2193	2.780	1.207 3387	16.119 021	0.062 0385
.731	.186 0582	.348 228	.065 1541	.781	.207 7730	.135 148	.061 9765
.732	.186 4925	.363 583	.065 0890	.782	.208 2072	.151 291	.061 9146
.733	.186 9268	.378 955	.065 0239	.783	.208 6415	.167 451	.061 8527
.734	.187 3611	.394 341	.064 9589	.784	.209 0758	.183 626	.061 7908
2.735	1.187 7954	15.409 743	0.064 8940	2.785	1.209 5101	16.199 818	0.061 7291
.736	.188 2297	.425 161	.064 8291	.786	.209 9444	.216 026	.061 6674
.737	.188 6640	.440 504	.064 7643	.787	.210 3787	.232 250	.061 6058
.738	.189 0983	.456 042	.064 6995	.788	.210 8130	.248 490	.061 5442
.739	.189 5326	.471 506	.064 6349	.789	.211 2473	.264 747	.061 4827
2.740	1.189 9669	15.486 685	0.064 5703	2.790	1.211 6816	16.281 020	0.061 4212
.741	.190 4012	.502 480	.064 5058	.791	.212 1159	.297 309	.061 3598
.742	.190 8355	.517 990	.064 4413	.792	.212 5502	.313 614	.061 2985
.743	.191 2698	.533 516	.064 3769	.793	.212 9845	.329 936	.061 2372
.744	.191 7041	.549 057	.064 3126	.794	.213 4188	.346 271	.061 1760
2.745	1.192 1384	15.564 614	0.064 2483	2.795	1.213 8531	16.362 629	0.061 1149
.746	.192 5726	.580 180	.064 1841	.796	.214 2874	.379 000	.061 0538
.747	.193 0069	.595 774	.064 1199	.797	.214 7217	.395 387	.061 0328
.748	.193 4412	.611 378	.064 0558	.798	.215 1560	.411 790	.061 0318
.749	.193 8755	.626 997	.063 9918	.799	.215 5903	.428 210	.061 0709
2.750	1.194 3098	15.642 632	0.063 9279	2.800	1.216 0245	16.444 647	0.061 0101
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
2.800	1.216 0245	16.441 647	0.060 8101	2.850	1.237 7304	17.287 782	0.057 8443
.801	.216 4583	.461 000	.000 7493	.851	.238 1739	.405 078	.057 7835
.802	.216 8331	.477 509	.000 6886	.852	.238 6079	.412 393	.057 7237
.803	.217 2474	.494 955	.000 6279	.853	.239 0422	.419 734	.057 6640
.804	.217 7017	.513 557	.000 5673	.854	.239 4765	.427 071	.057 6044
2.805	1.218 1950	16.527 076	0.060 5038	2.855	1.239 9107	17.374 447	0.057 5558
.806	.218 6303	.531 611	.000 4103	.856	.240 3459	.434 320	.057 4983
.807	.219 0546	.550 163	.000 3539	.857	.240 7793	.441 581	.057 4408
.808	.219 4689	.569 712	.000 3435	.858	.241 2130	.448 839	.057 3834
.809	.219 9332	.591 317	.000 2953	.859	.241 6479	.456 074	.057 3261
2.810	1.220 3675	16.609 018	0.060 2050	2.860	1.242 0822	17.461 527	0.057 2688
.811	.220 8018	.620 536	.000 1418	.861	.242 5165	.463 297	.057 2115
.812	.221 2361	.643 171	.000 6847	.862	.242 9508	.470 585	.057 1543
.813	.221 6704	.669 823	.000 6246	.863	.243 3851	.477 890	.057 0971
.814	.222 1047	.696 491	.059 9647	.864	.243 8194	.485 111	.057 0401
2.815	1.222 5390	16.693 176	0.059 9047	2.865	1.244 2537	17.549 053	0.056 9831
.816	.222 9733	.709 827	.059 8448	.866	.244 6880	.492 361	.056 9262
.817	.223 4076	.726 595	.059 7850	.867	.245 1224	.499 585	.056 8693
.818	.223 8418	.744 331	.059 7253	.868	.245 5567	.506 779	.056 8124
.819	.224 2761	.760 682	.059 6656	.869	.245 9909	.513 940	.056 7557
2.820	1.224 7104	16.776 351	0.059 6059	2.870	1.246 4252	17.637 018	0.056 6989
.821	.225 1447	.793 636	.059 5461	.871	.246 8595	.521 064	.056 6423
.822	.225 5790	.810 438	.059 4868	.872	.247 2938	.528 223	.056 5850
.823	.226 0133	.827 257	.059 4271	.873	.247 7280	.535 360	.056 5281
.824	.226 4476	.844 092	.059 3680	.874	.248 1624	.542 468	.056 4726
2.825	1.226 8819	16.860 945	0.059 3087	2.875	1.248 5966	17.725 421	0.056 4161
.826	.227 3162	.877 811	.059 2494	.876	.249 0309	.549 538	.056 3598
.827	.227 7505	.894 701	.059 1902	.877	.249 4652	.556 580	.056 3034
.828	.228 1848	.911 601	.059 1310	.878	.249 8995	.563 594	.056 2471
.829	.228 6191	.928 521	.059 0719	.879	.250 3338	.570 578	.056 1909
2.830	1.229 0534	16.945 461	0.059 0129	2.880	1.250 7681	17.814 323	0.056 1348
.831	.229 4877	.960 415	.058 9539	.881	.251 2024	.577 537	.056 0787
.832	.229 9220	.979 386	.058 8949	.882	.251 6367	.584 472	.056 0226
.833	.230 3563	.999 374	.058 8361	.883	.252 0710	.591 381	.055 9666
.834	.230 7906	17.013 378	.058 7773	.884	.252 5053	.598 263	.055 9107
2.835	1.231 2249	17.030 400	0.058 7185	2.885	1.252 9396	17.903 368	0.055 8548
.836	.231 6592	.047 439	.058 6598	.886	.253 3739	.605 120	.055 7980
.837	.232 0935	.061 495	.058 6012	.887	.253 8082	.611 841	.055 7412
.838	.232 5277	.081 563	.058 5426	.888	.254 2425	.618 530	.055 6845
.839	.232 9620	.098 658	.058 4841	.889	.254 6768	.625 185	.055 6278
2.840	1.233 3963	17.115 766	0.058 4257	2.890	1.255 1111	17.993 310	0.055 5763
.841	.233 8306	.132 899	.058 3673	.891	.255 5453	.631 812	.055 5207
.842	.234 2649	.150 941	.058 3089	.892	.255 9796	.638 285	.055 4652
.843	.234 6992	.167 190	.058 2507	.893	.256 4139	.644 727	.055 4097
.844	.235 1335	.181 365	.058 1924	.894	.256 8482	.651 137	.055 3544
2.845	1.235 5678	17.201 559	0.058 1343	2.895	1.257 2825	18.083 501	0.055 2970
.846	.236 0021	.218 799	.058 0762	.896	.257 7168	.657 504	.055 2418
.847	.236 4364	.235 996	.058 0181	.897	.258 1511	.663 845	.055 1865
.848	.236 8707	.253 241	.057 9601	.898	.258 5854	.670 153	.055 1313
.849	.237 3050	.270 503	.057 9022	.899	.259 0197	.676 428	.055 0763
2.850	1.237 7393	17.287 782	0.057 8443	2.900	1.259 4540	18.174 145	0.055 0232
$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
2.900	1.259 4540	18.171 145	0.055 0232	2.950	1.281 1687	19.105 951	0.052 3397
.901	.259 8881	.102 329	.051 9582	.951	.281 6030	.125 000	.052 2874
.902	.260 3326	.110 530	.051 9133	.952	.282 0373	.144 201	.052 2351
.903	.260 7769	.128 750	.051 8584	.953	.282 4716	.163 358	.052 1829
.904	.261 1912	.140 988	.051 8036	.954	.282 9059	.182 531	.052 1308
2.905	1.261 6255	18.265 241	0.051 7488	2.955	1.283 3402	19.201 723	0.052 0787
.905	.262 0598	.153 518	.051 6941	.955	.283 7745	.220 934	.052 0266
.907	.262 4041	.161 811	.051 6394	.957	.284 2088	.240 165	.051 9746
.908	.262 8384	.170 122	.051 5848	.958	.284 6431	.259 414	.051 9227
.909	.263 2726	.178 451	.051 5302	.959	.285 0774	.278 683	.051 8708
2.910	1.263 7069	18.356 790	0.051 4757	2.960	1.285 5117	19.297 972	0.051 8189
.911	.264 1412	.187 165	.051 4213	.961	.285 9460	.317 279	.051 7671
.912	.264 5755	.195 549	.051 3669	.962	.286 3803	.336 605	.051 7154
.913	.265 0098	.204 952	.051 3125	.963	.286 8145	.355 953	.051 6637
.914	.265 4441	.213 373	.051 2583	.964	.287 2488	.375 318	.051 6121
2.915	1.265 8784	18.448 812	0.051 2040	2.965	1.287 6831	19.394 703	0.051 5605
.916	.266 3127	.222 470	.051 1499	.965	.288 1174	.414 108	.051 5089
.917	.266 7470	.231 857	.051 0957	.967	.288 5517	.433 531	.051 4575
.918	.267 1813	.241 242	.051 0417	.968	.288 9860	.452 975	.051 4060
.919	.267 6156	.250 755	.050 9876	.969	.289 4203	.472 437	.051 3546
2.920	1.268 0499	18.541 287	0.050 9337	2.970	1.289 8546	19.491 940	0.051 3033
.921	.268 4842	.259 848	.050 8798	.971	.290 2889	.511 421	.051 2520
.922	.268 9185	.269 407	.050 8259	.972	.290 7232	.530 942	.051 2008
.923	.269 3528	.278 995	.050 7721	.973	.291 1575	.550 483	.051 1496
.924	.269 7871	.288 601	.050 7184	.974	.291 5918	.570 043	.051 0985
2.925	1.270 2214	18.634 226	0.050 6647	2.975	1.292 0261	19.589 623	0.051 0474
.926	.270 6557	.298 870	.050 6111	.976	.292 4604	.600 223	.050 9964
.927	.271 0899	.308 532	.050 5575	.977	.292 8947	.628 812	.050 9454
.928	.271 5242	.318 213	.050 5039	.978	.293 3290	.648 480	.050 8945
.929	.271 9585	.327 912	.050 4505	.979	.293 7633	.668 139	.050 8437
2.930	1.272 3928	18.727 631	0.050 3970	2.980	1.294 1976	19.687 817	0.050 7928
.931	.272 8271	.337 608	.050 3437	.981	.294 6319	.707 514	.050 7421
.932	.273 2614	.347 323	.050 2901	.982	.295 0661	.727 232	.050 6913
.933	.273 6957	.357 058	.050 2371	.983	.295 5004	.746 959	.050 6407
.934	.274 1300	.366 801	.050 1839	.984	.295 9347	.766 726	.050 5901
2.935	1.274 5643	18.821 503	0.050 1307	2.985	1.296 3690	19.786 502	0.050 5395
.935	.275 0086	.376 534	.050 0776	.986	.296 8033	.806 299	.050 4890
.937	.275 4429	.386 281	.050 0246	.987	.297 2375	.825 115	.050 4385
.938	.275 8772	.396 052	.050 0116	.988	.297 6719	.845 951	.050 3881
.939	.276 3115	.405 840	.050 0186	.989	.298 1062	.865 807	.050 3377
2.940	1.276 7458	18.915 846	0.050 0657	2.990	1.298 5405	19.885 682	0.050 2874
.941	.277 1801	.415 572	.050 0129	.991	.298 9748	.905 578	.050 2372
.942	.277 6144	.425 323	.050 0601	.992	.299 4091	.925 494	.050 1870
.943	.278 0487	.435 090	.050 0707	.993	.299 8434	.945 429	.050 1368
.944	.278 4830	.444 861	.050 0547	.994	.300 2777	.965 385	.050 0867
2.945	1.278 9172	19.010 662	0.050 6021	2.995	1.300 7120	19.985 360	0.050 0366
.945	.279 3515	.454 633	.050 5495	.995	.301 1463	20.085 355	.049 9866
.947	.279 7858	.464 422	.050 4970	.997	.301 5805	.025 371	.049 9367
.948	.280 2201	.474 230	.050 4445	.998	.302 0149	.045 406	.049 8867
.949	.280 6544	.484 057	.050 3921	.999	.302 4492	.065 461	.049 8369
2.950	1.281 1687	19.105 954	0.050 3397	3.000	1.302 8834	20.085 537	0.049 7871
$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_e(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$



The Exponential.

$x$	$\log_e(e^x)$	$e^x$	$e^{-x}$	$x$	$\log_e(e^x)$	$e^x$	$e^{-x}$
3.00	1.302 8834	20.085 537	0.049 7871	3.50	1.520 0307	33.115 452	0.010 0924
.01	.307 2204	.287 300	.049 2017	.51	.531 4634	1.48 4 35	.030 8900
.02	.311 5003	.291 202	.048 8912	.52	.533 7170	.781 1 20	.030 9904
.03	.315 9133	.297 333	.048 4150	.53	.536 0598	11.0 3 605	.030 3090
.04	.320 2552	.305 213	.047 8340	.54	.538 4923	1400 010	.030 0133
3.05	1.324 5082	21.115 341	0.047 3580	3.55	1.541 7434	11.814 305	0.008 2246
.05	.328 9111	.312 557	.046 8877	.55	.540 6851	35.003 02	.038 4388
.07	.333 2841	.319 003	.046 4112	.57	.550 4361	5.00 503	.033 6580
.08	.337 6270	.325 802	.045 9503	.58	.551 7742	31.3 510	.027 8287
.09	.341 9690	.332 078	.045 5030	.59	.553 1073	36.234 074	.027 5083
3.10	1.346 3120	22.197 051	0.045 0693	3.60	1.556 4001	36.598 211	0.027 3337
.11	.350 6558	.339 041	.044 6500	.61	.557 7301	1000 023	.027 0518
.12	.354 9988	.346 381	.044 1572	.62	.559 1160	17.137 533	.026 7332
.13	.359 3417	.353 680	.043 7178	.63	.560 4830	712 857	.026 5102
.14	.363 6847	.361 103	.043 2838	.64	.561 8410	34.001 137	.026 3523
3.15	1.368 0276	23.336 065	0.042 8521	3.65	1.565 1240	38.474 661	0.025 9911
.15	.372 3706	.368 505	.042 4357	.65	.562 5178	330 313	.025 7335
.17	.376 7135	.3807 381	.042 0030	.67	.563 3907	30.231 005	.025 4295
.18	.381 0565	.387 016	.041 5837	.68	.564 2607	100 101	.025 3230
.19	.385 3994	.393 288	.041 1719	.69	.565 1306	30.011 312	.025 0220
3.20	1.369 7423	24.532 830	0.040 7623	3.70	1.606 3866	40.117 304	0.024 7315
.21	.391 0853	.399 685	.040 3566	.71	.611 3335	333 130	.024 4775
.22	.395 4282	.406 812	.039 9551	.72	.615 3253	41.231 324	.024 3310
.23	.400 7712	.414 062	.039 5575	.73	.619 3181	1020 103	.024 0938
.24	.405 1141	.421 322	.039 1639	.74	.623 3114	43.047 030	.024 7811
3.25	1.411 4574	25.700 310	0.038 7742	3.75	1.608 6013	44.341 682	0.023 5177
.25	.415 8003	.428 537	.038 3831	.75	.623 9173	1013 427	.023 3812
.27	.420 1430	.434 339	.037 9861	.77	.627 2002	43.360 035	.023 0531
.28	.424 4859	.440 173	.037 5833	.78	.631 6331	3310 012	.022 8332
.29	.428 8288	.446 041	.037 1838	.79	.635 9261	44.056 400	.022 5056
3.30	1.433 1718	27.112 630	0.036 8332	3.80	1.605 3100	44.701 181	0.022 3708
.31	.437 5147	.452 125	.036 4360	.81	.634 0030	45.150 410	.022 1382
.32	.441 8577	.458 351	.036 0338	.82	.638 0030	101 003	.021 9028
.33	.446 2006	.464 612	.035 6331	.83	.642 3120	46.003 303	.021 7086
.34	.450 5436	.470 910	.035 2370	.84	.646 0033	3505 471	.021 4936
3.35	1.434 8806	28.504 734	0.034 8841	3.85	1.603 0338	46.993 093	0.021 3707
.35	.454 9295	.478 191	.034 7353	.85	.650 3202	47.105 335	.021 0680
.37	.463 5724	.49078 527	.034 3870	.87	.654 7106	1013 304	.020 8381
.38	.467 9153	.497 271	.034 0175	.88	.658 0606	48.111 315	.020 6088
.39	.472 2583	.505 952	.033 7087	.89	.662 4035	1010 387	.020 4453
3.40	1.426 6012	29.964 100	0.033 3731	3.90	1.603 7485	49.403 419	0.020 2410
.41	.480 9442	.506 205	.033 0412	.91	.668 0014	358 052	.020 0405
.42	.485 2871	.512 415	.032 7124	.92	.672 4334	50.400 415	.019 8411
.43	.489 6301	.518 643	.032 3869	.93	.676 7773	1000 073	.019 6437
.44	.493 9730	.524 898	.032 0647	.94	.681 1203	51.418 601	.019 4482
3.45	1.468 3160	31.500 302	0.031 7456	3.95	1.713 4633	51.935 302	0.019 2517
.45	.502 6580	.530 977	.031 4281	.95	.685 8001	52.457 356	.019 0641
.47	.507 0019	.537 133	.031 1170	.97	.691 1401	53.1 531	.018 8731
.48	.511 3448	.543 242	.030 8074	.98	.695 4820	53.512 033	.018 6856
.49	.515 6877	.549 308	.030 5002	.99	.699 8250	54.034 189	.018 4997
3.50	1.520 0307	33.115 452	0.030 1924	4.00	1.737 1779	54.598 150	0.018 3156
$\log_e(e^x)$	$\log_e(e^x)$	$e^x$	$e^{-x}$	$\log_e(e^x)$	$\log_e(e^x)$	$e^x$	$e^{-x}$

# The Exponential.

$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$u$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$
.100	1.737 1770	54.568 150	0.018 3156	4.50	1.954 3252	90.017 131	0.011 1090
.101	.741 5409	55.146 871	.018 1334	.51	.958 6681	.021 819	.010 9585
.102	.745 8438	.701 105	.017 9530	.52	.963 0111	91.835 598	.010 8890
.103	.750 2068	56.260 911	.017 7743	.53	.967 3540	92.758 561	.010 7807
.104	.754 5497	.826 343	.017 5975	.54	.971 6969	93.690 800	.010 6734
4.05	1.758 8027	57.397 457	0.017 4224	4.55	1.976 0399	94.632 408	0.010 5672
.051	.763 2456	.924 311	.017 2460	.56	.980 3828	95.583 486	.010 4621
.052	.767 5785	58.556 963	.017 0774	.57	.984 7258	96.544 110	.010 3580
.053	.771 9215	59.145 470	.016 9075	.58	.989 0687	97.514 394	.010 2549
.054	.776 2644	.739 892	.016 7392	.59	.993 4117	98.494 430	.010 1529
4.10	1.780 6074	60.340 288	0.016 5727	4.60	1.997 7546	99.484 316	0.010 0518
.11	.784 9503	.946 718	.016 4078	.61	2.002 0976	100.484 150	.009 9518
.112	.789 2933	61.559 242	.016 2445	.62	.006 4405	101.494 032	.009 8528
.113	.793 6362	62.177 923	.016 0829	.63	.010 7835	102.514 061	.009 7548
.114	.797 9792	.802 821	.015 9229	.64	.015 1264	103.544 348	.009 6577
4.15	1.802 3221	63.434 000	0.015 7644	4.65	2.019 4693	104.584 986	0.009 5616
.16	.806 6650	64.071 523	.015 6076	.66	.023 8123	105.636 082	.009 4665
.17	.811 0080	.715 452	.015 4523	.67	.028 1552	106.697 743	.009 3723
.18	.815 3509	65.365 853	.015 2985	.68	.032 4982	107.770 073	.009 2790
.19	.819 6939	66.022 791	.015 1463	.69	.036 8411	108.853 180	.009 1867
4.20	1.824 0368	66.686 331	0.014 9956	4.70	2.041 1841	109.947 172	0.009 0953
.21	.828 3798	67.356 540	.014 8461	.71	.045 5270	111.052 160	.009 0046
.22	.832 7227	68.033 484	.014 6980	.72	.049 8700	112.168 253	.008 9152
.23	.837 0657	.717 232	.014 5524	.73	.054 2129	113.295 563	.008 8265
.24	.841 4086	69.107 852	.014 4076	.74	.058 5558	114.434 202	.008 7386
4.25	1.845 7515	70.105 412	0.014 2642	4.75	2.062 8683	115.584 285	0.008 6517
.26	.850 0945	.809 983	.014 1223	.76	.067 2417	116.745 926	.008 5656
.27	.854 4374	71.521 635	.013 9818	.77	.071 5847	117.919 242	.008 4804
.28	.858 7804	72.240 440	.013 8427	.78	.075 9276	119.101 351	.008 3960
.29	.863 1233	.966 468	.013 7049	.79	.080 2706	120.301 369	.008 3125
4.30	1.867 4663	73.609 794	0.013 5685	4.80	2.084 6135	121.510 418	0.008 2297
.31	.871 8092	74.440 489	.013 4335	.81	.088 9565	122.731 618	.008 1479
.32	.876 1522	75.188 628	.013 2999	.82	.093 2994	123.965 091	.008 0668
.33	.880 4951	.944 287	.013 1675	.83	.097 6423	125.210 961	.007 9865
.34	.884 8381	76.707 539	.013 0365	.84	.101 9853	126.469 352	.007 9071
4.35	1.889 1810	77.478 463	0.012 9068	4.85	2.106 3282	127.740 399	0.007 8284
.36	.893 5239	78.257 131	.012 7784	.86	.110 6712	129.024 203	.007 7505
.37	.897 8669	79.043 632	.012 6512	.87	.115 0141	130.320 918	.007 6734
.38	.902 2098	.838 033	.012 5254	.88	.119 3571	131.630 665	.007 5970
.39	.906 5528	80.640 419	.012 4007	.89	.123 7000	132.953 575	.007 5214
4.40	1.910 8957	81.450 869	0.012 2773	4.90	2.128 0430	134.289 780	0.007 4466
.41	.915 2387	82.269 464	.012 1552	.91	.132 3859	135.639 415	.007 3725
.42	.919 5816	83.096 285	.012 0342	.92	.136 7289	137.002 613	.007 2991
.43	.923 9246	.931 417	.011 9145	.93	.141 0718	138.379 513	.007 2265
.44	.928 2675	84.774 942	.011 7959	.94	.145 4147	139.770 259	.007 1546
4.45	1.932 6101	85.626 944	0.011 6786	4.95	2.149 7577	141.174 964	0.007 0834
.46	.936 9534	86.487 509	.011 5624	.96	.154 1006	142.593 796	.007 0129
.47	.941 2963	87.356 723	.011 4473	.97	.158 4436	144.026 888	.006 9431
.48	.945 6393	88.234 673	.011 3334	.98	.162 7865	145.474 382	.006 8741
.49	.949 9822	89.121 440	.011 2206	.99	.167 1295	146.936 424	.006 8057
4.50	1.954 3252	90.017 131	0.011 1090	5.00	2.171 4724	148.413 159	0.006 7379
$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$	$\log_{10}(e^u)$	$\log_{10}(e^u)$	$e^u$	$e^{-u}$

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
5.00	2.171 4721	148.413 159	0.006 7379	5.50	2.388 6197	244.691 932	0.004 0868
.01	.175 8154	149.904 736	.006 6709	.51	.392 0630	247.151 132	.004 0461
.02	.180 1583	151.411 304	.006 6045	.52	.397 3058	249.635 032	.004 0058
.03	.184 5012	152.933 013	.006 5388	.53	.401 6485	252.144 011	.003 9660
.04	.188 8442	154.470 015	.006 4737	.54	.405 9914	254.677 000	.003 9265
5.05	2.193 1871	156.022 461	0.006 4093	5.55	2.410 3341	257.237 536	0.003 8875
.06	.197 5301	157.590 516	.006 3450	.56	.414 6773	259.829 836	.003 8488
.07	.201 8730	159.171 327	.006 2814	.57	.419 0203	262.456 000	.003 8105
.08	.206 2160	160.774 056	.006 2190	.58	.423 3633	265.117 000	.003 7726
.09	.210 5589	162.399 862	.006 1580	.59	.427 7063	267.813 030	.003 7350
5.10	2.211 9010	164.021 907	0.006 0967	5.60	2.413 0491	270.545 407	0.003 6979
.11	.219 2448	165.670 355	.006 0361	.61	.430 3920	273.314 133	.003 6611
.12	.223 5877	167.335 300	.005 9760	.62	.434 7350	276.119 311	.003 6246
.13	.227 9307	169.017 118	.005 9166	.63	.439 0779	278.962 117	.003 5886
.14	.232 2736	170.715 768	.005 8577	.64	.443 4209	281.843 718	.003 5529
5.15	2.236 6166	172.431 400	0.005 7991	5.65	2.453 7638	284.764 465	0.003 5175
.16	.240 9595	174.164 455	.005 7417	.66	.448 1068	287.724 643	.003 4825
.17	.245 3025	175.914 847	.005 6846	.67	.452 4497	290.724 531	.003 4479
.18	.249 6454	177.682 811	.005 6280	.68	.456 7927	293.864 430	.003 4136
.19	.253 9884	179.468 553	.005 5720	.69	.461 1356	297.044 636	.003 3796
5.20	2.258 3313	181.272 212	0.005 5166	5.70	2.475 4785	298.867 401	0.003 3460
.21	.262 6743	183.094 058	.005 4617	.71	.470 8215	301.827 003	.003 3127
.22	.267 0172	184.934 184	.005 4073	.72	.475 1644	304.924 033	.003 2797
.23	.271 3601	186.792 804	.005 3535	.73	.479 5074	308.160 203	.003 2471
.24	.275 7031	188.670 103	.005 3003	.74	.483 8503	311.536 411	.003 2148
5.25	2.280 6460	190.566 269	0.005 2475	5.75	2.497 1933	314.054 630	0.003 1828
.26	.284 9890	192.481 491	.005 1951	.76	.491 5362	317.714 320	.003 1511
.27	.289 3319	194.415 063	.005 1436	.77	.495 8791	321.517 733	.003 1198
.28	.293 6749	196.369 875	.005 0924	.78	.500 2221	325.466 100	.003 0887
.29	.297 4178	198.343 426	.005 0418	.79	.504 5651	329.561 031	.003 0580
5.30	2.301 7608	200.336 810	0.004 9916	5.80	2.518 4080	330.801 360	0.003 0276
.31	.306 1037	202.350 228	.004 9419	.81	.522 7509	334.181 136	.003 0074
.32	.310 4466	204.383 882	.004 8928	.82	.527 0939	337.702 051	.002 9876
.33	.314 7896	206.437 974	.004 8441	.83	.531 4368	341.364 621	.002 9681
.34	.319 1325	208.512 710	.004 7959	.84	.535 7798	345.170 311	.002 9488
5.35	2.323 4755	210.608 208	0.004 7482	5.85	2.540 6227	347.234 381	0.002 9299
.36	.327 8184	212.724 946	.004 7000	.86	.544 9657	350.244 141	.002 9114
.37	.332 1614	214.862 868	.004 6521	.87	.549 3086	353.400 080	.002 8930
.38	.336 5043	217.022 275	.004 6048	.88	.553 6516	357.700 242	.002 8748
.39	.340 8473	219.203 386	.004 5620	.89	.557 9945	362.146 284	.002 8569
5.40	2.345 1902	221.406 416	0.004 5166	5.90	2.562 3371	366.741 768	0.002 8394
.41	.349 5331	223.631 588	.004 4716	.91	.566 6801	371.488 150	.002 8222
.42	.353 8761	225.879 122	.004 4271	.92	.571 0231	376.388 711	.002 8052
.43	.358 2190	228.149 215	.004 3831	.93	.575 3661	381.445 511	.002 7885
.44	.362 5620	230.442 183	.004 3395	.94	.579 7092	386.661 930	.002 7720
5.45	2.366 9049	232.758 166	0.004 2963	5.95	2.584 0522	388.783 339	0.002 7568
.46	.371 2479	235.097 424	.004 2536	.96	.588 3951	397.010 121	.002 7419
.47	.375 5908	237.460 193	.004 2112	.97	.592 7381	391.505 621	.002 7272
.48	.379 9338	239.846 707	.004 1693	.98	.597 0810	396.140 348	.002 7128
.49	.384 2767	242.257 207	.004 1278	.99	.601 4239	399.914 610	.002 7037
5.50	2.388 6197	244.691 932	0.004 0868	6.00	2.605 7669	403.428 793	0.002 4788
$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$	$\log_{10}(e^n)$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$

MITHONIAN TABLES

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$e^{-n}$
1	.43429 44819	2.71 828 183	0.367 879 441
2	.86858 89638	7.38 905 610	0.135 335 283
3	1.30288 34457	20.0 855 369	(1) 497 870 684
4	1.73717 79276	54.5 981 500	(1) 183 156 389
5	2.17147 24095	148. 413 159	(2) 673 794 700
6	2.60576 68914	403. 438 793	(2) 247 875 218
7	3.04006 13733	109 6.63 316	(3) 911 881 956
8	3.47435 58552	298 0.95 799	(3) 335 462 628
9	3.90865 03371	810 3.08 393	(3) 123 409 804
10	4.34294 48190	220 26.4 658	(4) 453 959 298
11	4.77723 93009	598 74.1 417	(4) 167 017 008
12	5.21153 37828	162 754. 791	(5) 614 421 235
13	5.64582 82647	442 413. 392	(5) 226 032 941
14	6.08012 27466	120 260 4.28	(6) 831 528 719
15	6.51441 72285	326 901 7.37	(6) 305 902 321
16	6.94871 17105	888 611 0.52	(6) 112 535 175
17	7.38300 61924	241 549 52.8	(7) 413 993 772
18	7.81730 06743	656 509 69.1	(7) 152 299 797
19	8.25159 51562	178 482 301.	(8) 560 279 644
20	8.68588 96381	485 165 195.	(8) 206 115 362
21	9.12018 41200	131 881 573 [1]	(9) 758 256 043
22	9.55447 86019	358 491 285 [1]	(9) 278 946 809
23	9.98877 30838	974 480 345 [1]	(9) 102 618 796
24	10.42306 75657	261 891 221 [2]	(10) 377 513 454
25	10.85736 20476	720 048 993 [2]	(10) 138 879 439
26	11.29165 65295	195 729 609 [3]	(11) 510 908 903
27	11.72595 10114	532 048 241 [3]	(11) 187 952 882
28	12.16024 54933	144 625 766 [4]	(12) 691 440 011
29	12.59453 99752	393 133 430 [4]	(12) 254 366 565
30	13.02883 44571	105 864 746 [5]	(13) 935 762 297
31	13.46312 89390	290 488 407 [5]	(13) 344 247 711
32	13.89742 34209	789 620 602 [5]	(13) 126 641 655
33	14.33171 79028	214 643 580 [6]	(14) 465 888 615
34	14.76601 23847	583 461 743 [6]	(14) 171 399 843
35	15.20030 68666	158 601 345 [7]	(15) 630 511 676
36	15.63460 13485	431 123 155 [7]	(15) 231 952 283
37	16.06889 58304	117 191 424 [8]	(16) 853 304 763
38	16.50319 03123	318 559 318 [8]	(16) 313 913 270
39	16.93748 47942	865 934 004 [8]	(16) 115 482 242
40	17.37177 92761	235 385 267 [9]	(17) 424 835 426
41	17.80607 37580	639 843 493 [9]	(17) 156 288 219
42	18.24036 82399	173 927 494 [10]	(18) 574 952 226
43	18.67466 27218	472 783 947 [10]	(18) 211 513 104
44	19.10895 72037	128 516 001 [11]	(19) 778 113 221
45	19.54325 16856	349 342 711 [11]	(19) 286 251 858
46	19.97754 61675	949 611 942 [11]	(19) 105 366 174
47	20.41184 06495	258 131 289 [12]	(20) 387 399 763
48	20.84613 51314	701 673 591 [12]	(20) 142 516 408
49	21.28042 96133	190 734 657 [13]	(21) 524 283 566
50	21.71472 40952	518 470 553 [13]	(21) 192 874 985

The numbers in square brackets denote the numbers of figures between the last figure given and the decimal point; for example, the first nine figures of  $e^{20}$  are 518,470,553, and there are 13 additional figures before the decimal point is reached. The numbers in parentheses denote the numbers of ciphers between the decimal point and the first significant figure; for example, in  $e^{-20}$  there are 21 ciphers between the decimal point and the figures 192874985.

# The Exponential.

$n$	$\log_{10}(e^n)$	$e^n$	$n$
51	22.14001 85771	140 934 608 [14]	(22) 700 547 416
52	22.583341 34590	383 100 800 [14]	(22) 301 037 007
53	23.01700 75109	101 147 591 [15]	(23) 070 268 005
54	23.45100 20228	283 075 330 [15]	(23) 353 302 857
55	23.88509 65017	769 478 532 [15]	(23) 129 958 113
56	24.33049 03836	209 105 950 [16]	(24) 478 650 383
57	24.75478 54685	568 572 000 [16]	(24) 175 870 220
58	25.18007 99504	151 553 804 [17]	(25) 647 053 493
59	25.62337 44323	430 121 040 [17]	(25) 248 030 641
60	26.05706 89142	114 300 749 [18]	(26) 875 654 175
61	26.49105 34961	310 429 704 [18]	(26) 332 134 020
62	26.92525 78780	813 835 637 [18]	(26) 118 506 480
63	27.36035 23509	239 378 316 [19]	(27) 435 974 000
64	27.79484 68418	623 514 908 [19]	(27) 160 381 080
65	28.22914 13237	169 388 024 [20]	(28) 500 000 034
66	28.66343 58056	460 718 603 [20]	(28) 197 052 301
67	29.09773 02875	125 236 317 [21]	(29) 708 400 423
68	29.53202 47694	340 437 605 [21]	(29) 203 738 311
69	29.96631 92513	935 378 173 [21]	(29) 108 053 038
70	30.40061 37332	251 513 857 [22]	(30) 397 544 071
71	30.83490 82151	683 297 133 [22]	(30) 146 348 633
72	31.26920 26970	185 857 175 [23]	(31) 538 018 610
73	31.70349 71789	505 239 393 [23]	(31) 197 035 988
74	32.13779 16608	137 348 298 [24]	(32) 738 129 013
75	32.57208 61427	373 424 300 [24]	(32) 367 844 670
76	33.00638 06246	101 480 039 [25]	(33) 635 415 490
77	33.44067 51065	275 851 310 [25]	(33) 363 514 002
78	33.87496 95885	740 811 700 [25]	(33) 133 304 383
79	34.30926 40704	203 838 107 [26]	(34) 400 604 473
80	34.74355 85523	554 062 438 [26]	(34) 180 488 139
81	35.17785 30342	150 609 731 [27]	(35) 603 927 230
82	35.61214 75161	409 399 666 [27]	(35) 244 350 074
83	36.04644 19980	111 286 376 [28]	(36) 898 584 504
84	36.48073 64799	303 507 233 [28]	(36) 330 570 603
85	36.91503 09618	822 301 371 [28]	(36) 121 600 030
86	37.34932 54437	233 524 620 [29]	(37) 412 377 031
87	37.78361 99256	607 603 033 [29]	(37) 164 581 143
88	38.21791 44075	165 164 630 [30]	(38) 605 400 030
89	38.65220 88894	448 951 383 [30]	(38) 222 740 356
90	39.08650 33713	122 010 339 [31]	(39) 810 401 264
91	39.52079 78532	331 740 010 [31]	(39) 301 440 870
92	39.95509 23351	901 762 811 [31]	(39) 110 803 003
93	40.38938 68170	245 124 554 [32]	(40) 407 055 892
94	40.82368 12989	665 412 623 [32]	(40) 130 078 570
95	41.25797 57808	181 124 008 [33]	(41) 552 168 228
96	41.69227 02627	492 345 829 [33]	(41) 203 100 266
97	42.12656 47446	133 833 472 [34]	(42) 747 102 431
98	42.56085 92265	361 792 005 [34]	(42) 274 823 501
99	42.99515 37084	983 603 032 [34]	(42) 101 122 140
100	43.42944 81903	268 811 741 [35]	(43) 372 007 523

The numbers in square brackets denote the numbers of figures between the last figure given and the decimal point; for example, the first nine figures of  $e^{10}$  are 518470553, and there are 13 additional figures before the decimal point is reached. The numbers in parentheses denote the numbers of figures between the decimal point and the first significant figure; for example, in  $e^{-10}$  there are 21 ciphers between the decimal point and the figures 192874985.

# Auxiliary Table for Interpolation of $\text{Log}_{10}(e^u)$ .

( $p = n \times 43429.44819 \dots$ )

n	p	n	p	n	p	n	p	n	p
0.000	000	0.050	2171	0.100	4343	0.150	6514	0.200	8686
.001	043	.051	2215	.101	4386	.151	6558	.201	8729
.002	087	.052	2258	.102	4430	.152	6601	.202	8773
.003	130	.053	2302	.103	4473	.153	6645	.203	8816
.004	174	.054	2345	.104	4517	.154	6688	.204	8860
0.005	217	0.055	2389	0.105	4560	0.155	6732	0.205	8903
.006	261	.056	2432	.106	4604	.156	6775	.206	8946
.007	304	.057	2475	.107	4647	.157	6818	.207	8990
.008	347	.058	2519	.108	4690	.158	6862	.208	9033
.009	391	.059	2562	.109	4734	.159	6905	.209	9077
0.010	434	0.060	2606	0.110	4777	0.160	6949	0.210	9120
.011	478	.061	2649	.111	4821	.161	6992	.211	9164
.012	521	.062	2693	.112	4864	.162	7036	.212	9207
.013	565	.063	2736	.113	4908	.163	7079	.213	9250
.014	608	.064	2779	.114	4951	.164	7122	.214	9294
0.015	651	0.065	2823	0.115	4994	0.165	7166	0.215	9337
.016	695	.066	2866	.116	5038	.166	7209	.216	9381
.017	738	.067	2910	.117	5081	.167	7253	.217	9424
.018	782	.068	2953	.118	5125	.168	7296	.218	9468
.019	825	.069	2997	.119	5168	.169	7340	.219	9511
0.020	869	0.070	3040	0.120	5212	0.170	7383	0.220	9554
.021	912	.071	3083	.121	5255	.171	7426	.221	9598
.022	955	.072	3127	.122	5298	.172	7470	.222	9641
.023	999	.073	3170	.123	5342	.173	7513	.223	9685
.024	1042	.074	3214	.124	5385	.174	7557	.224	9728
0.025	1086	0.075	3257	0.125	5429	0.175	7600	0.225	9772
.026	1129	.076	3301	.126	5472	.176	7644	.226	9815
.027	1173	.077	3344	.127	5516	.177	7687	.227	9858
.028	1216	.078	3387	.128	5559	.178	7730	.228	9902
.029	1259	.079	3431	.129	5602	.179	7774	.229	9945
0.030	1303	0.080	3474	0.130	5646	0.180	7817	0.230	9989
.031	1346	.081	3518	.131	5689	.181	7861	.231	10032
.032	1390	.082	3561	.132	5733	.182	7904	.232	10076
.033	1433	.083	3605	.133	5776	.183	7948	.233	10119
.034	1477	.084	3648	.134	5820	.184	7991	.234	10162
0.035	1520	0.085	3692	0.135	5863	0.185	8034	0.235	10206
.036	1563	.086	3735	.136	5906	.186	8078	.236	10249
.037	1607	.087	3778	.137	5950	.187	8121	.237	10293
.038	1650	.088	3822	.138	5993	.188	8165	.238	10336
.039	1694	.089	3865	.139	6037	.189	8208	.239	10380
0.040	1737	0.090	3909	0.140	6080	0.190	8252	0.240	10423
.041	1781	.091	3952	.141	6124	.191	8295	.241	10466
.042	1824	.092	3996	.142	6167	.192	8338	.242	10510
.043	1867	.093	4039	.143	6210	.193	8382	.243	10553
.044	1911	.094	4082	.144	6254	.194	8425	.244	10597
0.045	1954	0.095	4126	0.145	6297	0.195	8469	0.245	10640
.046	1998	.096	4169	.146	6341	.196	8512	.246	10684
.047	2041	.097	4213	.147	6384	.197	8556	.247	10727
.048	2085	.098	4256	.148	6428	.198	8599	.248	10771
.049	2128	.099	4300	.149	6471	.199	8642	.249	10814
0.050	2171	0.100	4343	0.150	6514	0.200	8686	0.250	10857
n	p	n	p	n	p	n	p	n	p

# Auxiliary Table for Interpolation of $\text{Log}_{10}(e^x)$ .

$$(p = n \times .4342944819 \dots)$$

n	p	n	p	n	p	n	p	n	p
0.250	10857	0.300	13020	0.350	15200	0.400	17372	0.450	19543
.251	10901	.301	13072	.351	15244	.401	17415	.451	19587
.252	10944	.302	13116	.352	15287	.402	17459	.452	19630
.253	10988	.303	13159	.353	15331	.403	17502	.453	19674
.254	11031	.304	13203	.354	15374	.404	17545	.454	19717
0.255	11075	0.305	13246	0.355	15417	0.405	17589	0.455	19760
.256	11118	.306	13289	.356	15461	.406	17632	.456	19804
.257	11161	.307	13333	.357	15504	.407	17676	.457	19847
.258	11205	.308	13376	.358	15548	.408	17719	.458	19891
.259	11248	.309	13420	.359	15591	.409	17763	.459	19934
0.260	11292	0.310	13463	0.360	15635	0.410	17806	0.460	19978
.261	11335	.311	13507	.361	15678	.411	17850	.461	20021
.262	11379	.312	13550	.362	15721	.412	17893	.462	20064
.263	11422	.313	13593	.363	15765	.413	17936	.463	20108
.264	11465	.314	13637	.364	15808	.414	17980	.464	20151
0.265	11509	0.315	13680	0.365	15852	0.415	18023	0.465	20195
.266	11552	.316	13724	.366	15895	.416	18067	.466	20238
.267	11596	.317	13767	.367	15939	.417	18110	.467	20282
.268	11639	.318	13811	.368	15982	.418	18154	.468	20325
.269	11683	.319	13854	.369	16025	.419	18197	.469	20368
0.270	11726	0.320	13897	0.370	16069	0.420	18240	0.470	20412
.271	11769	.321	13941	.371	16112	.421	18284	.471	20455
.272	11813	.322	13984	.372	16156	.422	18327	.472	20499
.273	11856	.323	14028	.373	16199	.423	18371	.473	20542
.274	11900	.324	14071	.374	16243	.424	18414	.474	20586
0.275	11943	0.325	14115	0.375	16286	0.425	18458	0.475	20629
.276	11987	.326	14158	.376	16329	.426	18501	.476	20673
.277	12030	.327	14201	.377	16371	.427	18544	.477	20716
.278	12074	.328	14245	.378	16416	.428	18588	.478	20759
.279	12117	.329	14288	.379	16460	.429	18631	.479	20803
0.280	12160	0.330	14332	0.380	16503	0.430	18675	0.480	20846
.281	12204	.331	14375	.381	16547	.431	18718	.481	20890
.282	12247	.332	14419	.382	16590	.432	18762	.482	20933
.283	12291	.333	14462	.383	16634	.433	18805	.483	20977
.284	12334	.334	14505	.384	16677	.434	18848	.484	21020
0.285	12377	0.335	14549	0.385	16720	0.435	18892	0.485	21063
.286	12421	.336	14592	.386	16764	.436	18935	.486	21107
.287	12464	.337	14636	.387	16807	.437	18979	.487	21150
.288	12508	.338	14679	.388	16851	.438	19022	.488	21194
.289	12551	.339	14723	.389	16894	.439	19066	.489	21237
0.290	12595	0.340	14766	0.390	16937	0.440	19109	0.490	21281
.291	12638	.341	14810	.391	16981	.441	19153	.491	21324
.292	12681	.342	14853	.392	17024	.442	19196	.492	21367
.293	12725	.343	14896	.393	17068	.443	19240	.493	21411
.294	12768	.344	14940	.394	17111	.444	19283	.494	21454
0.295	12812	0.345	14983	0.395	17155	0.445	19326	0.495	21498
.296	12855	.346	15027	.396	17198	.446	19370	.496	21541
.297	12899	.347	15070	.397	17241	.447	19413	.497	21584
.298	12942	.348	15113	.398	17285	.448	19456	.498	21628
.299	12985	.349	15157	.399	17328	.449	19500	.499	21671
0.300	13029	0.350	15200	0.400	17372	0.450	19543	0.500	21715
n	p	n	p	n	p	n	p	n	p

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TABLE V

NATURAL LOGARITHMS

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NOTE.—In Table V, for  $n$  greater than 158, linear interpolation of  $\log_e n$  suffices to give a value whose error is not greater than one unit in the last place.



Natural Logarithms.

$n$	$\log n$	$\log F_n$	$n$	$\log n$	$\log F_n$	$n$	$\log n$	$\log F_n$	$n$	$\log n$	$\log F_n$
0	—	0	50	3.91202	2000	100	4.60517	1000	150	5.01064	667
1	0.00000	100000	51	3.91514	1001	101	4.61512	999	151	5.01238	663
2	0.60206	50000	52	3.91824	1002	102	4.62507	998	152	5.01412	659
3	1.09861	33333	53	3.92134	1003	103	4.63502	997	153	5.01586	655
4	1.38020	25000	54	3.92444	1004	104	4.64497	996	154	5.01760	651
5	1.60944	20000	55	4.00743	1818	105	4.65492	995	155	5.01934	647
6	1.77076	16667	56	4.02545	1786	106	4.66487	994	156	5.02108	643
7	1.94591	14286	57	4.04347	1754	107	4.67482	993	157	5.02282	639
8	2.07914	12500	58	4.06149	1721	108	4.68477	992	158	5.02456	635
9	2.19222	11111	59	4.07751	1695	109	4.69472	991	159	5.02630	631
10	2.30350	10000	60	4.09144	1667	110	4.70467	990	160	5.02804	627
11	2.39790	9091	61	4.11087	1639	111	4.71462	989	161	5.02978	623
12	2.48491	8333	62	4.12713	1611	112	4.72457	988	162	5.03152	619
13	2.56495	7692	63	4.14313	1587	113	4.73452	987	163	5.03326	615
14	2.63906	7143	64	4.15888	1562	114	4.74447	986	164	5.03500	611
15	2.70805	6667	65	4.17439	1538	115	4.75442	985	165	5.03674	607
16	2.77299	6250	66	4.18965	1515	116	4.76437	984	166	5.03848	603
17	2.83431	5882	67	4.20469	1491	117	4.77432	983	167	5.04022	599
18	2.89247	5556	68	4.21951	1471	118	4.78427	982	168	5.04196	595
19	2.94814	5263	69	4.23411	1449	119	4.79422	981	169	5.04370	591
20	3.00273	5000	70	4.24850	1429	120	4.80417	980	170	5.04544	587
21	3.05615	4762	71	4.26283	1408	121	4.81412	979	171	5.04718	583
22	3.09910	4545	72	4.27697	1389	122	4.82407	978	172	5.04892	579
23	3.14159	4348	73	4.29096	1370	123	4.83402	977	173	5.05066	575
24	3.18350	4167	74	4.30482	1351	124	4.84397	976	174	5.05240	571
25	3.22488	4000	75	4.31857	1333	125	4.85392	975	175	5.05414	567
26	3.26581	3846	76	4.33223	1316	126	4.86387	974	176	5.05588	563
27	3.30629	3701	77	4.34581	1300	127	4.87382	973	177	5.05762	559
28	3.34642	3571	78	4.35927	1282	128	4.88377	972	178	5.05936	555
29	3.38620	3448	79	4.37261	1266	129	4.89372	971	179	5.06110	551
30	3.42573	3333	80	4.38583	1250	130	4.90367	970	180	5.06284	547
31	3.46501	3226	81	4.39894	1235	131	4.91362	969	181	5.06458	543
32	3.50404	3125	82	4.41194	1220	132	4.92357	968	182	5.06632	539
33	3.54281	3030	83	4.42483	1205	133	4.93352	967	183	5.06806	535
34	3.58133	2941	84	4.43761	1190	134	4.94347	966	184	5.06980	531
35	3.61960	2857	85	4.45029	1176	135	4.95342	965	185	5.07154	527
36	3.65763	2778	86	4.46286	1163	136	4.96337	964	186	5.07328	523
37	3.69542	2703	87	4.47532	1150	137	4.97332	963	187	5.07502	519
38	3.73297	2631	88	4.48767	1136	138	4.98327	962	188	5.07676	515
39	3.77029	2561	89	4.49991	1124	139	4.99322	961	189	5.07850	511
40	3.80738	2500	90	4.51204	1111	140	5.00317	960	190	5.08024	507
41	3.84425	2439	91	4.52406	1099	141	5.01312	959	191	5.08198	503
42	3.88090	2381	92	4.53597	1087	142	5.02307	958	192	5.08372	499
43	3.91733	2326	93	4.54778	1075	143	5.03302	957	193	5.08546	495
44	3.95354	2273	94	4.55949	1064	144	5.04297	956	194	5.08720	491
45	3.98954	2222	95	4.57109	1053	145	5.05292	955	195	5.08894	487
46	4.02533	2174	96	4.58259	1042	146	5.06287	954	196	5.09068	483
47	4.06091	2128	97	4.59399	1031	147	5.07282	953	197	5.09242	479
48	4.09629	2083	98	4.60529	1020	148	5.08277	952	198	5.09416	475
49	4.13148	2041	99	4.61649	1010	149	5.09272	951	199	5.09590	471
50	4.16647	2000	100	4.62759	1000	150	5.10267	950	200	5.10764	467
$e^x$	$x$	$e^{-x}$	$e^x$	$x$	$e^{-x}$	$e^x$	$x$	$e^{-x}$	$e^x$	$x$	$e^{-x}$

# Natural Logarithms.

$u$	$\log u$	$\omega F_0'$	$u$	$\log u$	$\omega F_0'$	$u$	$\log u$	$\omega F_0'$	$u$	$\log u$	$\omega F_0'$
200	5.308332	500	250	5.52146	400	300	5.70378	333	350	5.85703	286
201	5.309330	498	251	5.52545	398	301	5.70711	332	351	5.86079	285
202	5.310327	495	252	5.52943	397	302	5.71043	331	352	5.86463	284
203	5.311321	493	253	5.53339	395	303	5.71373	330	353	5.86847	283
204	5.312312	490	254	5.53733	394	304	5.71703	329	354	5.87230	282
205	5.313301	488	255	5.54126	392	305	5.72031	328	355	5.87612	282
206	5.314288	485	256	5.54518	391	306	5.72359	327	356	5.87993	281
207	5.315273	483	257	5.54908	389	307	5.72685	326	357	5.88374	280
208	5.316254	481	258	5.55296	388	308	5.73010	325	358	5.88753	279
209	5.317233	478	259	5.55683	386	309	5.73334	324	359	5.89132	279
210	5.318211	476	260	5.56068	385	310	5.73657	323	360	5.89510	278
211	5.319186	474	261	5.56452	383	311	5.73979	322	361	5.89888	277
212	5.320159	472	262	5.56834	382	312	5.74300	321	362	5.90264	276
213	5.321130	469	263	5.57215	380	313	5.74620	319	363	5.90640	275
214	5.322098	467	264	5.57595	379	314	5.74939	318	364	5.91015	275
215	5.323064	465	265	5.57973	377	315	5.75257	317	365	5.91390	274
216	5.324028	463	266	5.58350	376	316	5.75574	316	366	5.91763	273
217	5.324990	461	267	5.58725	375	317	5.75890	315	367	5.92135	272
218	5.325950	459	268	5.59100	373	318	5.76205	314	368	5.92508	272
219	5.326907	457	269	5.59471	372	319	5.76519	313	369	5.92880	271
220	5.327863	455	270	5.59842	370	320	5.76832	312	370	5.93250	270
221	5.328816	452	271	5.60212	369	321	5.77144	312	371	5.93620	270
222	5.329768	450	272	5.60580	368	322	5.77455	311	372	5.93989	269
223	5.330717	448	273	5.60947	366	323	5.77765	310	373	5.94358	268
224	5.331665	446	274	5.61313	365	324	5.78074	309	374	5.94726	267
225	5.332610	444	275	5.61677	364	325	5.78383	308	375	5.95093	267
226	5.333553	442	276	5.62040	362	326	5.78690	307	376	5.95459	266
227	5.334495	441	277	5.62402	361	327	5.78996	306	377	5.95825	265
228	5.335435	439	278	5.62762	360	328	5.79301	305	378	5.96190	265
229	5.336372	437	279	5.63121	358	329	5.79606	304	379	5.96554	264
230	5.337308	435	280	5.63479	357	330	5.79909	303	380	5.96917	263
231	5.338242	433	281	5.63835	356	331	5.80212	302	381	5.97280	262
232	5.339174	431	282	5.64191	355	332	5.80513	301	382	5.97642	262
233	5.340104	429	283	5.64545	353	333	5.80814	300	383	5.98003	261
234	5.341032	427	284	5.64897	352	334	5.81114	299	384	5.98363	260
235	5.341959	426	285	5.65249	351	335	5.81413	299	385	5.98724	260
236	5.342883	424	286	5.65599	350	336	5.81711	298	386	5.99084	259
237	5.343806	422	287	5.65948	348	337	5.82008	297	387	5.99444	258
238	5.344727	420	288	5.66296	347	338	5.82305	296	388	5.99803	258
239	5.345646	418	289	5.66643	346	339	5.82600	295	389	5.99658	257
240	5.346564	417	290	5.66988	345	340	5.82895	294	390	5.99615	256
241	5.347480	415	291	5.67332	344	341	5.83188	293	391	5.99571	256
242	5.348394	413	292	5.67675	342	342	5.83481	292	392	5.99527	255
243	5.349306	412	293	5.68017	341	343	5.83773	292	393	5.99481	254
244	5.350217	410	294	5.68358	340	344	5.84064	291	394	5.99435	254
245	5.351126	408	295	5.68698	339	345	5.84354	290	395	5.99389	253
246	5.352033	407	296	5.69036	338	346	5.84644	289	396	5.99341	253
247	5.352939	405	297	5.69373	337	347	5.84932	288	397	5.99294	252
248	5.353843	403	298	5.69709	336	348	5.85220	287	398	5.99245	251
249	5.354745	402	299	5.70044	334	349	5.85507	287	399	5.99196	251
250	5.355646	400	300	5.70378	333	350	5.85793	286	400	5.99146	250
$0^x$	$x$	$0^{x-x}$	$0^x$	$x$	$0^{x-x}$	$0^x$	$x$	$0^{x-x}$	$0^x$	$x$	$0^{x-x}$

# Natural Logarithms.

n	log <sub>e</sub> n	ω F <sub>0</sub> '	n	log <sub>e</sub> n	ω F <sub>0</sub> '	n	log <sub>e</sub> n	ω F <sub>0</sub> '	n	log <sub>e</sub> n	ω F <sub>0</sub> '
400	5.99146	250	450	6.10925	222	500	6.21461	200	550	6.30902	182
401	5.99396	249	451	6.11147	222	501	6.21660	200	551	6.31173	181
402	5.99645	249	452	6.11368	221	502	6.21850	199	552	6.31453	181
403	5.99894	248	453	6.11589	221	503	6.22050	199	553	6.31736	181
404	6.00141	248	454	6.11810	220	504	6.22258	198	554	6.32016	181
405	6.00389	247	455	6.12030	220	505	6.22456	198	555	6.32294	180
406	6.00635	246	456	6.12249	219	506	6.22654	198	556	6.32577	180
407	6.00881	246	457	6.12468	219	507	6.22851	197	557	6.32857	180
408	6.01127	245	458	6.12687	218	508	6.23048	197	558	6.33130	179
409	6.01372	244	459	6.12905	218	509	6.23245	196	559	6.33405	179
410	6.01616	244	460	6.13123	217	510	6.23441	196	560	6.33683	179
411	6.01859	243	461	6.13340	217	511	6.23637	196	561	6.33962	178
412	6.02102	243	462	6.13556	216	512	6.23832	195	562	6.34238	178
413	6.02345	242	463	6.13773	216	513	6.24028	195	563	6.34518	178
414	6.02587	242	464	6.13988	216	514	6.24222	195	564	6.34793	177
415	6.02828	241	465	6.14204	215	515	6.24417	194	565	6.35063	177
416	6.03069	240	466	6.14419	215	516	6.24611	194	566	6.35339	177
417	6.03309	240	467	6.14633	214	517	6.24804	193	567	6.35616	176
418	6.03548	239	468	6.14847	214	518	6.24998	193	568	6.35893	176
419	6.03787	239	469	6.15060	213	519	6.25190	193	569	6.36168	176
420	6.04025	238	470	6.15273	213	520	6.25383	192	570	6.36444	175
421	6.04263	238	471	6.15486	212	521	6.25575	192	571	6.36720	175
422	6.04501	237	472	6.15698	212	522	6.25767	192	572	6.36994	175
423	6.04737	236	473	6.15910	211	523	6.25958	191	573	6.37269	175
424	6.04973	236	474	6.16121	211	524	6.26149	191	574	6.37543	174
425	6.05209	235	475	6.16331	211	525	6.26340	191	575	6.37817	174
426	6.05444	235	476	6.16542	210	526	6.26530	191	576	6.38091	174
427	6.05678	234	477	6.16752	210	527	6.26720	190	577	6.38364	173
428	6.05913	234	478	6.16961	209	528	6.26910	189	578	6.38638	173
429	6.06146	233	479	6.17170	209	529	6.27099	189	579	6.38911	173
430	6.06379	233	480	6.17379	208	530	6.27288	189	580	6.39184	173
431	6.06611	232	481	6.17587	208	531	6.27476	188	581	6.39457	173
432	6.06843	231	482	6.17794	207	532	6.27664	188	582	6.39730	172
433	6.07074	231	483	6.18002	207	533	6.27852	188	583	6.40003	172
434	6.07304	230	484	6.18208	207	534	6.28040	187	584	6.40276	171
435	6.07535	230	485	6.18415	206	535	6.28227	187	585	6.40549	171
436	6.07764	229	486	6.18621	206	536	6.28413	187	586	6.40822	171
437	6.07993	229	487	6.18826	205	537	6.28600	186	587	6.41095	170
438	6.08222	228	488	6.19032	205	538	6.28786	186	588	6.41368	170
439	6.08450	228	489	6.19236	204	539	6.28972	186	589	6.41641	170
440	6.08677	227	490	6.19441	204	540	6.29157	185	590	6.41914	169
441	6.08904	227	491	6.19644	204	541	6.29342	185	591	6.42187	169
442	6.09131	226	492	6.19848	203	542	6.29527	185	592	6.42460	169
443	6.09357	226	493	6.20051	203	543	6.29711	184	593	6.42733	169
444	6.09582	225	494	6.20254	202	544	6.29895	184	594	6.43006	168
445	6.09807	225	495	6.20456	202	545	6.30079	183	595	6.43279	168
446	6.10032	224	496	6.20658	202	546	6.30262	183	596	6.43552	168
447	6.10256	224	497	6.20859	201	547	6.30445	183	597	6.43825	167
448	6.10479	223	498	6.21060	201	548	6.30628	182	598	6.44098	167
449	6.10702	223	499	6.21261	200	549	6.30810	182	599	6.44371	167
50	6.10925	222	500	6.21461	200	550	6.30992	182	600	6.44644	167
x	8 <sup>-x</sup>	8 <sup>x</sup>	x	8 <sup>-x</sup>	8 <sup>x</sup>	x	8 <sup>-x</sup>	8 <sup>x</sup>	x	8 <sup>-x</sup>	8 <sup>x</sup>

ONIAN TABLE

# Natural Logarithms.

u	log <u>u</u>	$\omega F_0'$	u	log <u>u</u>	$\omega F_0'$	u	log <u>u</u>	$\omega F_0'$	u	log <u>u</u>	$\omega F_0'$
600	6.39693	167	650	6.47697	154	700	6.55108	143	750	6.62007	133
601	6.39859	166	651	6.47851	154	701	6.55251	143	751	6.62141	133
602	6.40026	166	652	6.48004	153	702	6.55393	142	752	6.62274	133
603	6.40192	166	653	6.48158	153	703	6.55536	142	753	6.62407	133
604	6.40357	166	654	6.48311	153	704	6.55678	142	754	6.62539	133
605	6.40523	165	655	6.48464	153	705	6.55820	142	755	6.62672	132
606	6.40688	165	656	6.48616	152	706	6.55962	142	756	6.62804	132
607	6.40853	165	657	6.48768	152	707	6.56103	141	757	6.62936	132
608	6.41017	164	658	6.48920	152	708	6.56244	141	758	6.63068	132
609	6.41182	164	659	6.49072	152	709	6.56386	141	759	6.63200	132
610	6.41346	164	660	6.49224	152	710	6.56526	141	760	6.63332	132
611	6.41510	164	661	6.49375	151	711	6.56667	141	761	6.63463	131
612	6.41673	163	662	6.49527	151	712	6.56808	140	762	6.63595	131
613	6.41836	163	663	6.49677	151	713	6.56948	140	763	6.63726	131
614	6.41999	163	664	6.49828	151	714	6.57088	140	764	6.63857	131
615	6.42162	163	665	6.49979	150	715	6.57228	140	765	6.63988	131
616	6.42325	162	666	6.50129	150	716	6.57368	140	766	6.64118	131
617	6.42487	162	667	6.50279	150	717	6.57508	139	767	6.64249	130
618	6.42649	162	668	6.50429	150	718	6.57647	139	768	6.64379	130
619	6.42811	162	669	6.50578	149	719	6.57786	139	769	6.64509	130
620	6.42973	161	670	6.50728	149	720	6.57925	139	770	6.64639	130
621	6.43133	161	671	6.50877	149	721	6.58064	139	771	6.64769	130
622	6.43294	161	672	6.51026	149	722	6.58203	139	772	6.64898	130
623	6.43455	161	673	6.51175	149	723	6.58341	138	773	6.65028	129
624	6.43615	160	674	6.51323	148	724	6.58479	138	774	6.65157	129
625	6.43775	160	675	6.51471	148	725	6.58617	138	775	6.65286	129
626	6.43935	160	676	6.51619	148	726	6.58755	138	776	6.65415	129
627	6.44095	159	677	6.51767	148	727	6.58893	138	777	6.65544	129
628	6.44254	159	678	6.51915	147	728	6.59030	137	778	6.65673	129
629	6.44413	159	679	6.52062	147	729	6.59167	137	779	6.65801	128
630	6.44572	159	680	6.52209	147	730	6.59304	137	780	6.65929	128
631	6.44731	158	681	6.52356	147	731	6.59441	137	781	6.66058	128
632	6.44889	158	682	6.52503	147	732	6.59578	137	782	6.66185	128
633	6.45047	158	683	6.52649	146	733	6.59715	136	783	6.66313	128
634	6.45205	158	684	6.52796	146	734	6.59851	136	784	6.66441	128
635	6.45362	157	685	6.52942	146	735	6.59987	136	785	6.66568	127
636	6.45520	157	686	6.53088	146	736	6.60123	136	786	6.66696	127
637	6.45677	157	687	6.53233	146	737	6.60259	136	787	6.66823	127
638	6.45834	157	688	6.53379	145	738	6.60394	136	788	6.66950	127
639	6.45990	156	689	6.53524	145	739	6.60530	135	789	6.67077	127
640	6.46147	156	690	6.53669	145	740	6.60665	135	790	6.67203	127
641	6.46303	156	691	6.53814	145	741	6.60800	135	791	6.67330	126
642	6.46459	156	692	6.53959	145	742	6.60935	135	792	6.67456	126
643	6.46614	156	693	6.54103	144	743	6.61070	135	793	6.67582	126
644	6.46770	155	694	6.54247	144	744	6.61204	134	794	6.67708	126
645	6.46925	155	695	6.54391	144	745	6.61338	134	795	6.67834	126
646	6.47080	155	696	6.54535	144	746	6.61473	134	796	6.67960	126
647	6.47235	155	697	6.54679	143	747	6.61607	134	797	6.68085	125
648	6.47389	154	698	6.54822	143	748	6.61740	134	798	6.68211	125
649	6.47543	154	699	6.54965	143	749	6.61874	134	799	6.68336	125
650	6.47697	154	700	6.55108	143	750	6.62007	133	800	6.68461	125
$e^x$	x	$e^{-x}$	$e^x$	x	$e^{-x}$	$e^x$	x	$e^{-x}$	$e^x$	x	$e^{-x}$

Natural Logarithms.

u	log <sub>e</sub> u	ω F <sub>0</sub> '	u	log <sub>e</sub> u	ω F <sub>0</sub> '	u	log <sub>e</sub> u	ω F <sub>0</sub> '	u	log <sub>e</sub> u	ω F <sub>0</sub> '
800	6.68461	125	850	6.74524	118	900	6.80239	111	950	6.85646	105
801	6.68586	125	851	6.74641	118	901	6.80351	111	951	6.85751	105
802	6.68711	125	852	6.74759	117	902	6.80461	111	952	6.85857	105
803	6.68835	125	853	6.74876	117	903	6.80572	111	953	6.85961	105
804	6.68960	124	854	6.74993	117	904	6.80683	111	954	6.86066	105
805	6.69084	124	855	6.75110	117	905	6.80793	110	955	6.86171	105
806	6.69208	124	856	6.75227	117	906	6.80904	110	956	6.86276	105
807	6.69332	124	857	6.75344	117	907	6.81014	110	957	6.86380	104
808	6.69456	124	858	6.75460	117	908	6.81125	110	958	6.86485	104
809	6.69580	124	859	6.75577	116	909	6.81235	110	959	6.86589	104
810	6.69703	123	860	6.75693	116	910	6.81344	110	960	6.86693	104
811	6.69827	123	861	6.75809	116	911	6.81454	110	961	6.86797	104
812	6.69950	123	862	6.75926	116	912	6.81564	110	962	6.86901	104
813	6.70073	123	863	6.76041	116	913	6.81674	110	963	6.87005	104
814	6.70196	123	864	6.76157	116	914	6.81783	109	964	6.87109	104
815	6.70319	123	865	6.76273	116	915	6.81892	109	965	6.87213	104
816	6.70441	123	866	6.76388	115	916	6.82002	109	966	6.87316	104
817	6.70564	122	867	6.76504	115	917	6.82111	109	967	6.87420	103
818	6.70686	122	868	6.76619	115	918	6.82220	109	968	6.87523	103
819	6.70808	122	869	6.76734	115	919	6.82329	109	969	6.87626	103
820	6.70930	122	870	6.76849	115	920	6.82437	109	970	6.87730	103
821	6.71052	122	871	6.76964	115	921	6.82546	109	971	6.87833	103
822	6.71174	122	872	6.77079	115	922	6.82655	108	972	6.87936	103
823	6.71296	122	873	6.77194	115	923	6.82763	108	973	6.88038	103
824	6.71417	121	874	6.77308	114	924	6.82871	108	974	6.88141	103
825	6.71538	121	875	6.77422	114	925	6.82979	108	975	6.88244	103
826	6.71659	121	876	6.77537	114	926	6.83087	108	976	6.88346	102
827	6.71780	121	877	6.77651	114	927	6.83195	108	977	6.88449	102
828	6.71901	121	878	6.77765	114	928	6.83303	108	978	6.88551	102
829	6.72022	121	879	6.77878	114	929	6.83411	108	979	6.88653	102
830	6.72143	120	880	6.77992	114	930	6.83518	108	980	6.88755	102
831	6.72263	120	881	6.78106	114	931	6.83626	107	981	6.88857	102
832	6.72383	120	882	6.78219	113	932	6.83733	107	982	6.88959	102
833	6.72503	120	883	6.78333	113	933	6.83841	107	983	6.89061	102
834	6.72623	120	884	6.78446	113	934	6.83948	107	984	6.89163	102
835	6.72743	120	885	6.78559	113	935	6.84055	107	985	6.89264	102
836	6.72863	120	886	6.78672	113	936	6.84162	107	986	6.89366	101
837	6.72982	119	887	6.78784	113	937	6.84268	107	987	6.89467	101
838	6.73102	119	888	6.78897	113	938	6.84375	107	988	6.89568	101
839	6.73221	119	889	6.79010	112	939	6.84482	106	989	6.89669	101
840	6.73340	119	890	6.79122	112	940	6.84588	106	990	6.89770	101
841	6.73459	119	891	6.79234	112	941	6.84694	106	991	6.89871	101
842	6.73578	119	892	6.79347	112	942	6.84801	106	992	6.89972	101
843	6.73697	119	893	6.79459	112	943	6.84907	106	993	6.90073	101
844	6.73815	118	894	6.79571	112	944	6.85013	106	994	6.90174	101
845	6.73934	118	895	6.79682	112	945	6.85118	106	995	6.90274	101
846	6.74052	118	896	6.79794	112	946	6.85224	106	996	6.90375	100
847	6.74170	118	897	6.79906	111	947	6.85330	105	997	6.90475	100
848	6.74288	118	898	6.80017	111	948	6.85435	105	998	6.90575	100
849	6.74405	118	899	6.80128	111	949	6.85541	105	999	6.90675	100
850	6.74524	118	900	6.80239	111	950	6.85646	105	1000	6.90776	100
e <sup>x</sup>	x	e <sup>-x</sup>	e <sup>x</sup>	x	e <sup>-x</sup>	e <sup>x</sup>	x	e <sup>-x</sup>	e <sup>x</sup>	x	e <sup>-x</sup>

# Natural Logarithms.

n	Log. n	n	Log. n	n	Log. n	n	Log. n	n	Log. n
1000	6.90776	1351	7.21598	1721	7.45066	2111	7.65492	2503	7.82525
1000	6.91072	1367	7.22037	1723	7.45182	2113	7.65586	2521	7.83241
1013	6.92697	1373	7.22175	1733	7.45761	2129	7.66341	2531	7.83637
1019	6.92558	1381	7.23056	1741	7.46221	2130	7.66435	2539	7.83953
1021	6.92851	1399	7.24351	1747	7.46566	2137	7.66716	2543	7.84110
1031	6.93838	1409	7.25064	1753	7.46908	2141	7.66903	2549	7.84346
1033	6.94052	1423	7.26052	1759	7.47250	2143	7.66990	2551	7.84424
1039	6.94100	1437	7.26333	1777	7.48268	2153	7.67462	2557	7.84659
1049	6.95550	1449	7.26473	1783	7.48605	2161	7.67833	2579	7.85516
1051	6.95730	1433	7.26753	1787	7.48829	2179	7.68662	2591	7.85980
1061	6.96907	1439	7.27170	1789	7.48941	2203	7.69758	2593	7.86057
1063	6.96885	1447	7.27225	1801	7.49610	2207	7.69839	2609	7.86672
1069	6.97448	1451	7.28091	1811	7.50163	2213	7.70216	2617	7.86978
1087	6.99118	1453	7.28139	1823	7.50821	2221	7.70571	2621	7.87131
1091	6.99485	1459	7.28551	1831	7.51262	2237	7.71289	2633	7.87588
1093	6.99568	1471	7.29370	1847	7.52132	2239	7.71378	2647	7.88118
1097	7.00033	1481	7.30017	1861	7.52887	2243	7.71557	2657	7.88495
1103	7.00579	1483	7.30183	1877	7.53209	2251	7.71913	2659	7.88571
1109	7.01131	1487	7.30152	1871	7.53423	2257	7.72634	2663	7.88721
1117	7.01840	1489	7.30586	1873	7.53530	2269	7.72769	2671	7.89021
1121	7.02376	1493	7.30851	1877	7.53743	2273	7.72886	2677	7.89245
1129	7.03000	1499	7.31255	1879	7.53819	2281	7.73237	2683	7.89469
1151	7.04830	1511	7.32053	1887	7.54380	2287	7.73500	2687	7.89518
1153	7.05012	1523	7.32811	1901	7.55911	2293	7.73762	2689	7.89592
1163	7.05876	1531	7.33368	1907	7.55349	2297	7.73936	2693	7.89841
1171	7.06561	1543	7.34148	1913	7.55513	2309	7.74457	2699	7.90064
1181	7.07412	1549	7.34336	1931	7.56579	2311	7.74541	2707	7.90360
1187	7.07918	1553	7.34791	1933	7.56681	2333	7.75491	2711	7.90507
1193	7.08433	1559	7.35180	1949	7.57507	2339	7.75748	2713	7.90581
1201	7.09091	1569	7.35692	1951	7.57610	2341	7.75833	2719	7.90802
1213	7.10085	1571	7.35947	1973	7.58731	2347	7.76689	2729	7.91169
1217	7.10114	1579	7.36455	1979	7.59035	2351	7.76660	2731	7.91242
1223	7.10995	1583	7.36768	1987	7.59438	2357	7.76514	2741	7.91608
1229	7.11304	1597	7.37583	1993	7.59740	2371	7.77107	2749	7.91879
1231	7.11558	1601	7.37838	1997	7.59940	2377	7.77359	2753	7.92045
1237	7.12041	1607	7.38312	1999	7.60040	2381	7.77528	2767	7.92552
1249	7.13110	1609	7.38337	2003	7.60240	2383	7.77612	2777	7.92913
1259	7.13807	1613	7.38585	2011	7.60639	2389	7.77893	2789	7.93344
1277	7.15247	1619	7.38956	2017	7.60937	2393	7.78030	2791	7.93416
1279	7.15383	1621	7.39080	2027	7.61431	2399	7.78281	2797	7.93630
1283	7.15606	1627	7.39419	2029	7.61530	2411	7.78780	2801	7.93773
1289	7.16162	1637	7.40063	2039	7.62021	2417	7.79028	2803	7.93845
1291	7.16317	1657	7.41276	2053	7.62700	2423	7.79276	2819	7.94114
1297	7.16781	1663	7.41638	2063	7.63102	2437	7.79552	2833	7.94909
1301	7.17089	1667	7.41878	2069	7.63482	2441	7.80016	2837	7.95050
1303	7.17242	1669	7.41998	2081	7.64060	2447	7.80262	2843	7.95262
1307	7.17549	1693	7.43426	2083	7.64156	2459	7.80751	2851	7.95543
1319	7.18463	1697	7.43662	2087	7.64348	2467	7.81076	2857	7.95753
1321	7.18614	1699	7.43780	2089	7.64444	2473	7.81319	2861	7.95893
1327	7.19068	1709	7.44366	2099	7.64922	2477	7.81480	2879	7.96520
e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x

# Natural Logarithms.

n	Log. n	n	Log. n	n	Log. n	n	Log. n	n	Log. n
3887	7.97707	3444	8.16862	3700	8.36853	4120	8.11570	4391	8.44535
3897	7.97743	3459	8.16943	3710	8.37071	4131	8.11650	4407	8.44601
3903	7.97750	3464	8.16994	3727	8.37199	4142	8.11751	4413	8.44611
3909	7.97756	3474	8.17062	3731	8.37297	4153	8.11850	4420	8.44685
3917	7.97781	3477	8.17152	3739	8.37397	4167	8.11955	4427	8.44706
3927	7.978173	3489	8.17249	3761	8.37541	4179	8.12051	4431	8.44716
3939	7.97853	3491	8.17300	3767	8.37603	4187	8.12151	4437	8.44737
3953	7.979033	3494	8.17356	3779	8.37716	4199	8.12251	4447	8.44781
3957	7.979104	3497	8.17356	3783	8.37821	4217	8.12351	4451	8.44813
3963	7.979190	3499	8.17359	3793	8.37921	4227	8.12451	4457	8.44831
3969	7.97958	3501	8.17383	3797	8.37962	4239	8.12551	4469	8.44841
3971	7.97965	3507	8.17430	3803	8.38026	4249	8.12651	4471	8.44864
3983	8.00003	3513	8.17435	3819	8.38107	4261	8.12751	4477	8.44913
3991	8.00070	3513	8.17441	3823	8.38161	4271	8.12851	4483	8.44931
3994	8.01003	3517	8.17531	3833	8.38219	4283	8.12951	4493	8.44959
3999	8.01368	3527	8.17616	3847	8.38305	4293	8.130503	4499	8.45081
3993	8.01400	3531	8.17641	3851	8.38359	4309	8.13150	4501	8.45141
3997	8.01834	3534	8.17689	3853	8.38384	4319	8.13250	4503	8.45191
3991	8.01991	3537	8.17701	3854	8.38390	4321	8.13290	4507	8.45228
3999	8.02257	3539	8.17704	3877	8.38634	4323	8.13307	4511	8.45260
3991	8.02650	3541	8.17791	3881	8.38685	4331	8.13411	4529	8.45447
3997	8.03136	3549	8.17803	3889	8.38694	4349	8.13504	4531	8.45441
3999	8.03436	3551	8.17806	3897	8.38703	4357	8.13597	4533	8.45491
3993	8.03460	3557	8.17836	3901	8.38715	4367	8.13691	4539	8.45572
3999	8.03590	3557	8.17836	3917	8.38763	4377	8.13791	4543	8.45583
3999	8.04306	3559	8.17877	3919	8.38769	4389	8.13890	4547	8.45691
3999	8.04507	3563	8.17891	3923	8.38791	4399	8.13979	4559	8.45703
3999	8.04501	3561	8.17960	3929	8.38804	4407	8.14081	4561	8.45791
3997	8.05102	3561	8.17916	3931	8.38805	4419	8.14181	4563	8.45816
3993	8.05923	3567	8.17986	3943	8.38920	4423	8.14290	4564	8.45913
3997	8.06051	3557	8.17669	3947	8.38971	4431	8.14311	4563	8.45908
3999	8.06112	3559	8.17723	3957	8.38977	4447	8.14391	4567	8.45991
3981	8.06195	3571	8.18000	3959	8.39010	4459	8.14490	4571	8.46031
3987	8.06681	3581	8.18140	3961	8.39110	4461	8.14510	4571	8.46061
3991	8.06809	3583	8.18190	3963	8.39150	4463	8.14557	4571	8.46103
3993	8.07181	3593	8.18271	3967	8.39250	4471	8.14671	4577	8.46259
3999	8.07471	3607	8.18293	3973	8.39290	4487	8.14703	4581	8.46271
3997	8.07670	3613	8.18330	3981	8.39350	4491	8.14753	4583	8.46291
3991	8.07745	3617	8.18340	3981	8.39380	4497	8.14811	4589	8.46383
3999	8.07993	3623	8.18390	3987	8.39403	4503	8.14851	4599	8.46486
3991	8.08492	3641	8.18776	3999	8.39553	4511	8.14950	4601	8.46530
3993	8.08733	3647	8.18811	4001	8.39623	4513	8.14955	4603	8.46570
3997	8.08856	3643	8.18806	4007	8.39680	4519	8.15005	4607	8.46615
3999	8.08908	3659	8.19095	4013	8.39704	4527	8.15050	4611	8.46623
3997	8.09285	3671	8.19323	4019	8.39761	4533	8.15115	4613	8.46634
3999	8.10137	3673	8.19896	4021	8.39851	4547	8.15200	4617	8.46856
3991	8.10198	3677	8.19885	4023	8.39901	4549	8.15201	4627	8.46957
3997	8.10380	3691	8.20005	4027	8.40001	4551	8.15201	4629	8.46967
3993	8.10561	3697	8.20523	4111	8.39143	4557	8.15252	4631	8.46978
3999	8.10742	3701	8.20636	4127	8.39351	4559	8.15276	4637	8.46989

# Natural Logarithms.

n	Log u	u	Log u	n	Log u	u	Log u	n	Log u
4993	8.51579	5437	8.60098	5849	8.67403	6287	8.74624	6733	8.81478
4999	8.51669	5441	8.60172	5851	8.67437	6299	8.74815	6737	8.81537
5003	8.51770	5443	8.60209	5857	8.67539	6301	8.74846	6761	8.81893
5009	8.51869	5449	8.60310	5861	8.67608	6311	8.75005	6763	8.81922
5011	8.51939	5471	8.60722	5867	8.67710	6317	8.75100	6779	8.82158
5021	8.52138	5477	8.60831	5869	8.67744	6323	8.75195	6781	8.82188
5023	8.52178	5479	8.60868	5870	8.67914	6329	8.75200	6791	8.82335
5039	8.52496	5483	8.60911	5891	8.67918	6337	8.75116	6793	8.82365
5051	8.52734	5501	8.61260	5907	8.68220	6343	8.75514	6803	8.82512
5059	8.52892	5503	8.61305	5903	8.68322	6353	8.75608	6823	8.82805
5077	8.53218	5507	8.61378	5923	8.68660	6359	8.75763	6827	8.82864
5081	8.53226	5519	8.61595	5927	8.68727	6361	8.75791	6829	8.82893
5087	8.53444	5521	8.61631	5939	8.68930	6367	8.75888	6833	8.82952
5099	8.53680	5527	8.61740	5953	8.69165	6373	8.75983	6841	8.83069
5101	8.53719	5531	8.61812	5981	8.69634	6379	8.76077	6857	8.83303
5107	8.53837	5557	8.62281	5987	8.69735	6389	8.76233	6863	8.83390
5113	8.53954	5563	8.62389	6007	8.70038	6397	8.76358	6869	8.83477
5119	8.54071	5569	8.62497	6011	8.70135	6421	8.76733	6871	8.83506
5117	8.54167	5573	8.62560	6029	8.70431	6427	8.76826	6883	8.83681
5153	8.54733	5581	8.62712	6037	8.70560	6449	8.77168	6889	8.83768
5167	8.55005	5591	8.63891	6043	8.70666	6451	8.77199	6907	8.84029
5171	8.55082	5623	8.64462	6047	8.70732	6469	8.77478	6911	8.84087
5179	8.55247	5639	8.64746	6053	8.70831	6473	8.77539	6917	8.84174
5189	8.55430	5641	8.64782	6067	8.71092	6481	8.77663	6917	8.84167
5197	8.55584	5647	8.64888	6073	8.71161	6491	8.77817	6919	8.84635
5207	8.55814	5651	8.65059	6079	8.71260	6521	8.78278	6959	8.84779
5227	8.56159	5653	8.65094	6089	8.71424	6529	8.78401	6961	8.84808
5231	8.56236	5657	8.65065	6091	8.71457	6547	8.78076	6967	8.84894
5233	8.56274	5659	8.65100	6101	8.71621	6551	8.78737	6971	8.84951
5237	8.56350	5669	8.65277	6113	8.71817	6553	8.78768	6977	8.85037
5261	8.56868	5683	8.65523	6121	8.71948	6563	8.78920	6983	8.85123
5273	8.57035	5689	8.65629	6131	8.72111	6569	8.79012	6991	8.85238
5279	8.57149	5693	8.65699	6133	8.72144	6571	8.79042	6997	8.85324
5281	8.57187	5701	8.65840	6143	8.72307	6577	8.79133	7001	8.85381
5297	8.57490	5711	8.65915	6151	8.72437	6581	8.79194	7013	8.85552
5303	8.57503	5717	8.66120	6163	8.72632	6599	8.79467	7019	8.85638
5309	8.57716	5737	8.66460	6173	8.72794	6607	8.79588	7027	8.85752
5313	8.57979	5741	8.66539	6197	8.73182	6619	8.79770	7039	8.85922
5333	8.58167	5743	8.66574	6199	8.73214	6637	8.80012	7043	8.85979
5347	8.58429	5749	8.66978	6203	8.73279	6653	8.80282	7057	8.86178
5351	8.58504	5779	8.66199	6211	8.73408	6659	8.80372	7059	8.86347
5381	8.59063	5783	8.66268	6217	8.73501	6661	8.80402	7079	8.86489
5387	8.59174	5791	8.66306	6221	8.73569	6673	8.80582	7103	8.86827
5393	8.59286	5801	8.66579	6229	8.73697	6679	8.80672	7107	8.86912
5399	8.59397	5807	8.66682	6247	8.73986	6689	8.80822	7121	8.87080
5407	8.59545	5813	8.66785	6257	8.74146	6691	8.80852	7127	8.87165
5413	8.59656	5821	8.66923	6263	8.74241	6701	8.81001	7129	8.87193
5417	8.59730	5827	8.67026	6269	8.74337	6703	8.81031	7151	8.87501
5419	8.59767	5839	8.67231	6271	8.74369	6709	8.81121	7159	8.87613
5421	8.59988	5843	8.67300	6277	8.74465	6719	8.81269	7177	8.87864
e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x



# Natural Logarithms.

n	Log. n	n	Log. n	n	Log. n	n	Log. n	n	Log. n
7187	8.85603	7631	8.88366	8075	8.90835	8519	8.93304	8963	8.95773
7193	8.85636	7639	8.88399	8081	8.90868	8525	8.93337	8969	8.95806
7207	8.85681	7643	8.88455	8111	8.91003	8559	8.93472	8993	8.95941
7211	8.85736	7649	8.88513	8117	8.91061	8569	8.93530	8999	8.95999
7213	8.85836	7669	8.88691	8121	8.91119	8571	8.93588	9001	8.96057
7219	8.85817	7673	8.88746	8147	8.91254	8583	8.93646	9011	8.96115
7229	8.85856	7681	8.88791	8161	8.91312	8597	8.93704	9017	8.96173
7237	8.85896	7687	8.88850	8167	8.91370	8601	8.93762	9021	8.96231
7243	8.85877	7691	8.88908	8171	8.91428	8611	8.93820	9029	8.96289
7247	8.85834	7699	8.88963	8179	8.91486	8617	8.93878	9027	8.96347
7253	8.85917	7703	8.89017	8191	8.91544	8621	8.93936	9031	8.96405
7283	8.86130	7717	8.89138	8309	8.91729	8699	8.94121	9101	8.96590
7297	8.86132	7733	8.89190	8319	8.91787	8707	8.94179	9109	8.96648
7307	8.86059	7747	8.89248	8341	8.91923	8731	8.94315	9131	8.96784
7309	8.86085	7741	8.89219	8331	8.91865	8729	8.94276	9121	8.96726
7321	8.86085	7753	8.89258	8333	8.91891	8731	8.94302	9127	8.96752
7331	8.86087	7757	8.89266	8347	8.91949	8739	8.94360	9137	8.96810
7333	8.86014	7759	8.89261	8341	8.91912	8747	8.94418	9147	8.96868
7349	8.86043	7789	8.89302	8351	8.91970	8741	8.94380	9151	8.96926
7351	8.86049	7793	8.89308	8369	8.92027	8749	8.94438	9159	8.96984
7369	8.86050	7817	8.89365	8371	8.92053	8741	8.94390	9161	8.97042
7393	8.86082	7833	8.89385	8397	8.92111	8747	8.94448	9167	8.97099
7411	8.861072	7849	8.89450	8391	8.92074	8741	8.94410	9169	8.97157
7417	8.861153	7841	8.89412	8393	8.92082	8747	8.94468	9171	8.97215
7433	8.861368	7853	8.89475	8397	8.92138	8751	8.94524	9179	8.97273
7451	8.861610	7867	8.89511	8411	8.92194	8759	8.94582	9181	8.97331
7457	8.861691	7873	8.89519	8417	8.92252	8769	8.94640	9187	8.97389
7459	8.861718	7877	8.89529	8419	8.92260	8771	8.94648	9189	8.97397
7477	8.861950	7879	8.89536	8431	8.92318	8781	8.94706	9191	8.97455
7481	8.862012	7883	8.89546	8433	8.92326	8789	8.94764	9197	8.97513
7487	8.862093	7901	8.89572	8439	8.92384	8791	8.94772	9199	8.97521
7489	8.862119	7907	8.89575	8457	8.92442	8799	8.94830	9201	8.97579
7499	8.86252	7919	8.89603	8467	8.92499	8801	8.94838	9207	8.97637
7507	8.862359	7927	8.89611	8469	8.92507	8807	8.94896	9211	8.97695
7517	8.862494	7933	8.89629	8499	8.92565	8811	8.94954	9217	8.97753
7543	8.862572	7937	8.89639	8433	8.92623	8819	8.95012	9219	8.97811
7549	8.862652	7949	8.89646	8439	8.92681	8821	8.95020	9221	8.97869
7537	8.862758	7951	8.89656	8441	8.92689	8829	8.95078	9227	8.97927
7541	8.862811	7963	8.89685	8443	8.92697	8837	8.95136	9231	8.97985
7547	8.862891	7993	8.89743	8447	8.92755	8839	8.95144	9237	8.98043
7549	8.862917	8009	8.89832	8461	8.92813	8841	8.95152	9239	8.98051
7559	8.863019	8011	8.89837	8467	8.92871	8849	8.95210	9241	8.98109
7591	8.863076	8017	8.89843	8491	8.92929	8851	8.95218	9247	8.98167
7573	8.863234	8039	8.89906	8513	8.92987	8859	8.95276	9251	8.98225
7577	8.863287	8053	8.89954	8521	8.93045	8861	8.95284	9257	8.98283
7583	8.863366	8059	8.89951	8527	8.93103	8869	8.95342	9261	8.98341
7589	8.863416	8069	8.89957	8537	8.93161	8871	8.95350	9267	8.98399
7591	8.863472	8081	8.89972	8539	8.93169	8879	8.95408	9269	8.98407
7603	8.863630	8087	8.89980	8541	8.93177	8881	8.95416	9271	8.98415
7607	8.863682	8089	8.89986	8591	8.93235	8889	8.95474	9277	8.98473
e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x

# Natural Logarithms.

u	Log <u>u</u>	u	Log <u>u</u>	u	Log <u>u</u>	u	Log <u>u</u>	u	Log <u>u</u>
9433	9.15197	9551	9.16440	9719	9.18184	9833	9.19330	9967	9.20703
9437	9.15239	9587	9.16816	9721	9.18204	9839	9.19411	9973	9.20764
9439	9.15261	9601	9.16962	9733	9.18328	9851	9.19533	10000	9.21034
9461	9.15493	9613	9.17087	9739	9.18389	9857	9.19594	100000	11.51293
9463	9.15514	9619	9.17150	9743	9.18430	9859	9.19614		
9467	9.15557	9623	9.17191	9749	9.18492	9871	9.19736		
9473	9.15620	9629	9.17253	9767	9.18676	9883	9.19857		
9479	9.15683	9631	9.17274	9769	9.18697	9887	9.19898		
9491	9.15810	9643	9.17399	9781	9.18820	9901	9.20039		
9497	9.15873	9649	9.17461	9787	9.18881	9907	9.20100		
9511	9.16020	9661	9.17585	9791	9.18922	9923	9.20261		
9521	9.16126	9677	9.17751	9803	9.19044	9929	9.20322		
9533	9.16251	9679	9.17771	9811	9.19126	9931	9.20342		
9539	9.16314	9689	9.17875	9817	9.19187	9941	9.20442		
9547	9.16398	9697	9.17957	9829	9.19309	9949	9.20523		
e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x	e <sup>x</sup>	x

Coefficients for Computing,

$$F_{\pm n} = F_0 \pm n\omega \left[ F'_0 \pm \frac{n}{2} \alpha_0 + \frac{n^2}{6} \beta_0 \pm \frac{n}{12} \left( \frac{n^2}{2} - 1 \right) \gamma_0 \right].$$

n	$\frac{n^2}{6}$	Diff.	$\frac{n}{12} \left( \frac{n^2}{2} - 1 \right)$	Diff.	n	$\frac{n^2}{6}$	Diff.	$\frac{n}{12} \left( \frac{n^2}{2} - 1 \right)$	Diff.
0.00	+0.0000	0	-0.0000	8	0.25	+0.0104	9	-0.0202	7
.01	.0000	1	.0008	9	.26	.0113	9	.0209	8
.02	.0001	1	.0017	8	.27	.0122	9	.0217	7
.03	.0002	1	.0025	8	.28	.0131	9	.0224	8
.04	.0003	1	.0033	9	.29	.0140	10	.0232	7
0.05	+0.0004	2	-0.0342	8	0.30	+0.0150	10	-0.0239	7
.05	.0005	2	.0050	8	.31	.0160	11	.0246	7
.07	.0008	3	.0058	8	.32	.0171	11	.0253	7
.08	.0011	3	.0056	9	.33	.0182	11	.0260	7
.09	.0014	3	.0075	8	.34	.0193	11	.0267	7
0.10	+0.0017	3	-0.0083	8	0.35	+0.0204	12	-0.0274	7
.11	.0020	4	.0091	8	.36	.0216	12	.0281	6
.12	.0024	4	.0099	8	.37	.0228	13	.0287	7
.13	.0028	4	.0107	8	.38	.0241	13	.0294	6
.14	.0033	5	.0116	8	.39	.0254	13	.0300	7
0.15	+0.0038	5	-0.0124	8	0.40	+0.0267	13	-0.0307	6
.16	.0043	5	.0132	8	.41	.0280	14	.0313	6
.17	.0048	6	.0140	8	.42	.0291	14	.0319	6
.18	.0054	6	.0148	7	.43	.0308	15	.0325	6
.19	.0050	7	.0155	8	.44	.0323	15	.0331	6
0.20	+0.0067	7	-0.0163	8	0.45	+0.0338	15	-0.0337	6
.21	.0074	7	.0171	8	.46	.0353	15	.0343	5
.22	.0081	7	.0179	8	.47	.0368	16	.0348	6
.23	.0088	8	.0187	7	.48	.0384	16	.0354	5
.24	.0096	8	.0194	8	.49	.0400	17	.0359	6
0.25	+0.0104		-0.0202		0.50	+0.0417		-0.0365	



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TABLE VI

THE GUDERMANNIAN

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The Gudermannian.

$u$	$\sin u$	$\cos u$	$\tan u$	$\sec u$	$u$	$\sin u$	$\cos u$	$\tan u$	$\sec u$
0.000	0.000 0000	1.0000	0.00 00.00	200.20	0.050	0.049 9792	0.988	2 56 48.05	200.01
.001	.001 0010	1.0000	0.03 25.36	200.20	.051	.050 9770	0.987	2 55 41.05	200.00
.002	.002 0000	1.0000	0.06 52.53	200.20	.052	.050 9706	0.986	2 53 40.04	200.00
.003	.003 0000	1.0000	0.10 18.70	200.20	.053	.050 9752	0.985	3 02 06.02	200.00
.004	.004 0000	1.0000	0.13 45.00	200.20	.054	.050 9738	0.984	3 03 32.30	200.00
0.005	0.005 0000	1.0000	0.17 11.32	200.20	0.055	0.051 9723	0.983	3 04 38.35	200.05
.006	.006 0000	1.0000	0.20 37.58	200.20	.056	.051 9708	0.982	3 05 24.30	200.04
.007	.007 0000	1.0000	0.24 03.81	200.20	.057	.051 9702	0.981	3 05 50.73	200.03
.008	.008 0000	1.0000	0.27 30.10	200.20	.058	.052 9703	0.980	3 06 06.00	200.02
.009	.009 0000	1.0000	0.30 56.45	200.20	.059	.053 9708	0.980	3 06 42.57	200.00
0.010	0.009 9998	.9999	0.34 22.61	200.25	0.060	0.050 9690	0.980	3 07 08.47	200.00
.011	.010 9998	.9999	0.37 48.37	200.25	.061	.050 9672	0.980	3 07 34.30	200.00
.012	.011 9997	.9999	0.41 15.12	200.25	.062	.050 9653	0.980	3 08 00.23	200.00
.013	.012 9996	.9999	0.44 41.37	200.25	.063	.050 9634	0.980	3 08 26.10	200.00
.014	.013 9995	.9999	0.48 07.61	200.24	.064	.050 9614	0.980	3 08 51.91	200.00
0.015	0.014 9994	.9999	0.51 33.84	200.24	0.065	0.050 9593	0.979	3 09 17.78	200.00
.016	.015 9993	.9999	0.55 00.10	200.24	.066	.050 9571	0.979	3 09 43.60	200.00
.017	.016 9992	.9999	0.58 26.33	200.24	.067	.050 9549	0.979	3 10 09.41	200.00
.018	.017 9990	.9998	1.01 52.57	200.24	.068	.050 9527	0.979	3 10 35.21	200.00
.019	.018 9989	.9998	1.05 18.80	200.24	.069	.050 9504	0.979	3 11 00.99	200.00
0.020	0.019 9987	.9998	1.08 45.02	200.24	0.070	0.050 9480	0.979	3 11 26.70	200.00
.021	.020 9985	.9998	1.12 11.24	200.24	.071	.050 9457	0.979	3 11 52.41	200.00
.022	.021 9983	.9998	1.15 37.46	200.24	.072	.050 9433	0.979	3 12 18.12	200.00
.023	.022 9980	.9997	1.19 03.67	200.24	.073	.050 9409	0.979	3 12 43.83	200.00
.024	.023 9977	.9997	1.22 29.88	200.24	.074	.050 9385	0.979	3 13 19.54	200.00
0.025	0.024 9974	.9997	1.25 56.08	200.20	0.075	0.050 9360	0.979	3 13 45.25	200.00
.026	.025 9971	.9997	1.29 22.28	200.20	.076	.050 9336	0.979	3 14 20.96	200.00
.027	.026 9967	.9996	1.32 48.47	200.19	.077	.050 9311	0.979	3 14 46.67	200.00
.028	.027 9963	.9996	1.36 14.66	200.18	.078	.050 9287	0.979	3 15 22.38	200.00
.029	.028 9959	.9995	1.39 40.84	200.18	.079	.050 9262	0.979	3 15 48.09	200.00
0.030	0.029 9955	.9995	1.43 07.03	200.17	0.080	0.050 9238	0.979	3 16 23.80	200.00
.031	.030 9950	.9995	1.46 33.19	200.17	.081	.050 9213	0.979	3 16 49.51	200.00
.032	.031 9945	.9995	1.49 59.35	200.16	.082	.050 9188	0.979	3 17 25.22	200.00
.033	.032 9940	.9995	1.53 25.50	200.15	.083	.050 9163	0.979	3 18 00.93	200.00
.034	.033 9935	.9994	1.56 51.65	200.15	.084	.050 9138	0.979	3 18 26.64	200.00
0.035	0.034 9930	.9994	1.60 17.79	200.14	0.085	0.050 9113	0.979	3 19 02.35	200.00
.036	.035 9925	.9994	1.63 43.93	200.13	.086	.050 9088	0.979	3 19 28.06	200.00
.037	.036 9920	.9994	1.67 10.07	200.12	.087	.050 9063	0.979	3 19 53.77	200.00
.038	.037 9915	.9993	1.70 36.18	200.12	.088	.050 9038	0.979	3 20 19.48	200.00
.039	.038 9910	.9993	1.74 02.29	200.11	.089	.050 9013	0.979	3 20 45.19	200.00
0.040	0.039 9903	.9992	1.77 28.39	200.10	0.090	0.050 8988	0.979	3 21 20.90	200.00
.041	.040 9898	.9992	1.80 54.49	200.09	.091	.050 8963	0.979	3 21 46.61	200.00
.042	.041 9892	.9991	1.84 20.58	200.08	.092	.050 8938	0.979	3 22 22.32	200.00
.043	.042 9886	.9991	1.87 46.65	200.07	.093	.050 8913	0.979	3 22 48.03	200.00
.044	.043 9880	.9990	1.91 12.72	200.07	.094	.050 8888	0.979	3 23 23.74	200.00
0.045	0.044 9874	.9990	1.94 38.79	200.06	0.095	0.050 8863	0.979	3 23 49.45	200.00
.046	.045 9868	.9989	1.98 04.84	200.05	.096	.050 8838	0.979	3 24 25.16	200.00
.047	.046 9862	.9989	2.01 30.88	200.04	.097	.050 8813	0.979	3 25 00.87	200.00
.048	.047 9856	.9988	2.04 56.91	200.03	.098	.050 8788	0.979	3 25 26.58	200.00
.049	.048 9850	.9988	2.08 22.93	200.02	.099	.050 8763	0.979	3 26 02.29	200.00
0.050	0.049 9792	.9988	2.11 48.95	200.01	0.100	0.050 8737	.9988	3 26 28.00	200.00
$u$	$2 \tan^{-1}(\sin u)$	$\frac{\pi}{2}$	$2 \tan^{-1}(\tan u)$	$\frac{\pi}{2}$	$u$	$2 \tan^{-1}(\sin u)$	$\frac{\pi}{2}$	$2 \tan^{-1}(\tan u)$	$\frac{\pi}{2}$

The Gudermannian.

u	gd u	$\omega F_0'$	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	gd u	$\omega F_0'$
0.100	0.099 8437	9950	5 43 12.19	205.21	0.150	0.149 4406	9889	8 33 44.35	203.97
.101	.100 8487	9949	5 46 37.12	205.22	.151	.150 4294	9887	8 37 08.30	203.94
.102	.101 8535	9948	5 50 02.62	205.20	.152	.151 4181	9886	8 40 32.22	203.90
.103	.102 8581	9947	5 53 27.81	205.18	.153	.152 4065	9884	8 43 56.11	203.87
.104	.103 8629	9946	5 56 52.97	205.15	.154	.153 3949	9883	8 47 19.96	203.84
0.105	0.104 8676	9945	6 00 18.12	205.13	0.155	0.154 3831	9881	8 50 43.79	203.81
.106	.105 8721	9944	6 03 43.24	205.11	.156	.155 3711	9880	8 54 07.59	203.78
.107	.106 8764	9943	6 07 08.34	205.09	.157	.156 3590	9878	8 57 31.35	203.75
.108	.107 8807	9942	6 10 33.42	205.07	.158	.157 3467	9876	9 00 55.08	203.72
.109	.108 8848	9941	6 13 58.48	205.05	.159	.158 3343	9875	9 04 18.78	203.68
0.110	0.109 8888	9940	6 17 23.51	205.02	0.160	0.159 3217	9873	9 07 42.45	203.65
.111	.110 8928	9939	6 20 48.52	205.00	.161	.160 3089	9872	9 11 06.09	203.62
.112	.111 8969	9938	6 24 13.51	204.98	.162	.161 2960	9870	9 14 29.69	203.59
.113	.112 9009	9936	6 27 38.48	204.95	.163	.162 2830	9869	9 17 53.23	203.55
.114	.113 9049	9935	6 31 03.42	204.93	.164	.163 2697	9867	9 21 16.80	203.52
0.115	0.114 9088	9934	6 34 28.34	204.91	0.165	0.164 2564	9865	9 24 40.31	203.49
.116	.115 9127	9933	6 37 53.24	204.88	.166	.165 2428	9864	9 28 03.78	203.46
.117	.116 9167	9932	6 41 18.11	204.86	.167	.166 2291	9862	9 31 27.22	203.42
.118	.117 9207	9931	6 44 42.96	204.84	.168	.167 2153	9861	9 34 50.62	203.39
.119	.118 9246	9930	6 48 07.78	204.81	.169	.168 2012	9859	9 38 13.99	203.35
0.120	0.119 9285	9928	6 51 32.59	204.79	0.170	0.169 1870	9857	9 41 37.33	203.32
.121	.120 9324	9927	6 54 57.36	204.76	.171	.170 1727	9856	9 45 00.63	203.29
.122	.121 9363	9926	6 58 22.11	204.74	.172	.171 1581	9854	9 48 23.90	203.25
.123	.122 9401	9925	7 01 46.81	204.71	.173	.172 1434	9852	9 51 47.14	203.22
.124	.123 9439	9924	7 05 11.54	204.69	.174	.173 1286	9851	9 55 10.33	203.18
0.125	0.124 9477	9922	7 08 36.22	204.66	0.175	0.174 1136	9849	9 58 33.50	203.15
.126	.125 9515	9921	7 12 00.87	204.64	.176	.175 9983	9847	10 01 56.63	203.11
.127	.126 9553	9920	7 15 25.49	204.61	.177	.176 9630	9845	10 05 19.72	203.08
.128	.127 9591	9919	7 18 50.09	204.59	.178	.177 9274	9844	10 08 42.78	203.04
.129	.128 9628	9917	7 22 14.67	204.56	.179	.178 8917	9842	10 12 05.80	203.00
0.130	0.129 9665	9916	7 25 39.22	204.53	0.180	0.179 8558	9840	10 15 28.78	202.97
.131	.130 9702	9915	7 29 03.74	204.51	.181	.180 8197	9838	10 18 51.73	202.93
.132	.131 9739	9913	7 32 28.23	204.48	.182	.181 7835	9837	10 22 14.65	202.90
.133	.132 9776	9912	7 35 52.70	204.45	.183	.181 7471	9835	10 25 37.52	202.85
.134	.133 9813	9911	7 39 17.14	204.43	.184	.182 7105	9833	10 29 00.36	202.82
0.135	0.134 9849	9910	7 42 41.55	204.40	0.185	0.183 6737	9831	10 32 23.17	202.78
.136	.135 9886	9908	7 46 05.94	204.37	.186	.184 6367	9829	10 35 45.93	202.75
.137	.136 9922	9907	7 49 30.29	204.34	.187	.185 5996	9828	10 39 08.66	202.71
.138	.137 9958	9906	7 52 54.62	204.32	.188	.186 5622	9826	10 42 31.35	202.67
.139	.138 9994	9904	7 56 18.93	204.29	.189	.187 5247	9824	10 45 54.01	202.63
0.140	0.139 1000	9903	7 59 43.20	204.26	0.190	0.188 4870	9822	10 49 16.62	202.60
.141	.140 1000	9901	8 03 07.45	204.23	.191	.189 4492	9820	10 52 39.20	202.56
.142	.141 1000	9900	8 06 31.69	204.20	.192	.190 4111	9818	10 56 01.74	202.52
.143	.142 1000	9899	8 09 55.85	204.17	.193	.191 3729	9817	10 59 24.24	202.48
.144	.143 1000	9897	8 13 20.01	204.14	.194	.192 3344	9815	11 02 46.71	202.44
0.145	0.144 1000	9896	8 16 44.14	204.12	0.195	0.193 2958	9813	11 06 09.13	202.40
.146	.145 1000	9894	8 20 08.24	204.09	.196	.194 2570	9811	11 09 31.51	202.37
.147	.146 1000	9893	8 23 32.31	204.06	.197	.195 2180	9809	11 12 53.86	202.33
.148	.147 1000	9891	8 26 56.35	204.03	.198	.196 1788	9807	11 16 16.17	202.29
.149	.148 1000	9890	8 30 20.36	204.00	.199	.197 1394	9805	11 19 38.43	202.25
0.150	0.149 4406	9889	8 33 44.35	203.97	0.200	0.198 6798	9803	11 23 00.66	202.21
u	$2 \ln n^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln n^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	u	$2 \ln n^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln n^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

$u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$\operatorname{gd} u$	$\operatorname{sech} u$
0.200	0.198 6708	0.9803	11 23 00.66	202.21	0.250	0.247 4338	0.9025	14 10 37.00	101.88
.201	.199 6601	0.9801	11 26 22.85	202.17	.251	.248 4052	0.9023	14 13 57.20	100.03
.202	.200 6401	0.9799	11 29 44.99	202.13	.252	.249 3741	0.9021	14 17 17.10	100.38
.203	.201 6200	0.9797	11 33 07.10	202.09	.253	.250 3413	0.9019	14 20 37.00	100.31
.204	.202 5996	0.9795	11 36 29.17	202.05	.254	.251 3121	0.9017	14 23 56.53	100.79
0.205	0.203 5790	0.9794	11 39 51.10	202.01	0.255	0.252 2803	0.9015	14 27 16.50	100.71
.206	.204 5583	0.9792	11 43 13.18	201.96	.256	.253 2488	0.9013	14 30 36.31	100.60
.207	.205 5374	0.9790	11 46 35.12	201.92	.257	.254 2167	0.9011	14 33 56.07	100.61
.208	.206 5165	0.9788	11 49 57.02	201.88	.258	.255 1845	0.9009	14 37 15.53	100.50
.209	.207 4949	0.9786	11 53 18.89	201.84	.259	.256 1520	0.9007	14 40 35.11	100.53
0.210	0.208 4733	0.9783	11 56 40.71	201.80	0.260	0.257 1193	0.9005	14 43 54.16	100.48
.211	.209 4515	0.9781	12 00 02.48	201.76	.261	.258 8603	0.9003	14 47 13.10	100.43
.212	.210 4300	0.9779	12 03 24.22	201.71	.262	.259 6230	0.9001	14 50 33.51	100.48
.213	.211 4074	0.9777	12 06 45.91	201.67	.263	.260 3853	0.9000	14 53 53.87	100.33
.214	.212 3851	0.9775	12 10 07.56	201.63	.264	.260 0457	0.9001	14 57 12.11	100.29
0.215	0.213 3635	0.9773	12 13 29.17	201.59	0.265	0.261 0518	0.9000	15 00 31.43	100.24
.216	.214 3407	0.9771	12 16 50.74	201.54	.266	.262 0175	0.9000	15 03 50.63	100.10
.217	.215 3167	0.9769	12 20 12.20	201.50	.267	.263 7830	0.9001	15 07 09.75	100.13
.218	.216 2935	0.9767	12 23 33.74	201.46	.268	.264 5483	0.9001	15 10 28.88	100.08
.219	.217 2701	0.9765	12 26 55.18	201.42	.269	.265 3133	0.9000	15 13 47.93	100.03
0.220	0.218 2465	0.9763	12 30 16.57	201.37	0.270	0.266 7731	0.9000	15 17 06.97	100.08
.221	.219 2247	0.9761	12 33 37.92	201.33	.271	.267 7435	0.9001	15 20 25.89	100.03
.222	.220 1989	0.9759	12 36 59.23	201.28	.272	.268 7098	0.9001	15 23 44.75	100.19
.223	.221 1744	0.9756	12 40 20.49	201.24	.273	.269 6838	0.9000	15 27 03.59	100.81
.224	.222 1499	0.9754	12 43 41.71	201.20	.274	.270 6445	0.9000	15 30 22.43	100.77
0.225	0.223 1252	0.9752	12 47 02.88	201.15	0.275	0.271 5028	0.9001	15 33 41.16	100.71
.226	.224 1003	0.9750	12 50 24.01	201.11	.276	.272 5013	0.9001	15 36 59.78	100.66
.227	.225 0753	0.9748	12 53 45.10	201.06	.277	.273 4543	0.9000	15 40 18.11	100.61
.228	.226 0499	0.9746	12 57 06.14	201.02	.278	.274 4083	0.9000	15 43 36.23	100.55
.229	.227 0243	0.9743	13 00 27.13	200.97	.279	.275 3691	0.9001	15 46 55.10	100.50
0.230	0.227 9986	0.9741	13 03 48.08	200.93	0.280	0.276 4114	0.9000	15 50 13.95	100.45
.231	.228 9726	0.9739	13 07 08.99	200.88	.281	.277 4211	0.9000	15 53 33.10	100.38
.232	.229 9461	0.9737	13 10 29.85	200.84	.282	.278 4350	0.9000	15 56 52.23	100.33
.233	.230 9199	0.9735	13 13 50.66	200.79	.283	.279 4061	0.9001	15 00 11.02	100.27
.234	.231 8933	0.9733	13 17 11.42	200.74	.284	.280 3775	0.9000	15 03 29.70	100.22
0.235	0.233 8664	0.9730	13 20 32.15	200.70	0.285	0.281 3181	0.9000	15 06 48.15	100.16
.236	.234 8393	0.9728	13 23 52.84	200.65	.286	.282 2785	0.9001	15 09 07.53	100.11
.237	.235 8120	0.9726	13 27 13.45	200.60	.287	.283 1993	0.9000	15 12 26.74	100.05
.238	.236 7841	0.9723	13 30 34.04	200.56	.288	.284 1691	0.9000	15 15 45.91	100.00
.239	.237 7566	0.9721	13 33 54.50	200.51	.289	.285 0991	0.9000	15 19 05.06	100.04
0.240	0.237 7286	0.9719	13 37 15.05	200.46	0.290	0.286 0186	0.9001	15 22 24.15	100.00
.241	.238 7004	0.9716	13 40 35.49	200.42	.291	.287 0273	0.9001	15 25 43.43	100.03
.242	.239 6719	0.9714	13 43 55.88	200.37	.292	.288 0363	0.9000	15 29 02.53	100.07
.243	.240 6432	0.9712	13 47 16.23	200.33	.293	.289 0455	0.9000	15 32 21.67	100.02
.244	.241 6143	0.9710	13 50 36.54	200.27	.294	.290 0550	0.9001	15 35 40.66	100.00
0.245	0.242 5851	0.9707	13 53 56.77	200.23	0.295	0.291 0641	0.9000	15 39 00.10	100.00
.246	.243 5557	0.9705	13 57 16.98	200.18	.296	.292 0729	0.9000	15 42 19.33	100.05
.247	.244 5261	0.9703	14 00 37.13	200.13	.297	.293 0825	0.9000	15 45 38.39	100.09
.248	.245 4962	0.9700	14 03 57.23	200.08	.298	.294 0919	0.9000	15 48 57.31	100.13
.249	.246 4661	0.9698	14 07 17.29	200.03	.299	.295 1010	0.9000	15 52 16.16	100.18
0.250	0.247 4358	0.9695	14 10 37.30	199.98	0.300	0.295 5087	0.9000	15 55 35.00	100.22
$u$	$2 \ln \frac{1}{1 - \tanh u} - \frac{u^2}{2}$	$\operatorname{sech} u$	$2 \ln \frac{1}{1 - \tanh u} - 90^\circ$	$\operatorname{sech} u$	$u$	$2 \ln \frac{1}{1 - \tanh u} - \frac{u^2}{2}$	$\operatorname{sech} u$	$2 \ln \frac{1}{1 - \tanh u} - 90^\circ$	$\operatorname{sech} u$

The Gudermannian.

u	gd u	$\omega F_0'$	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	gd u	$\omega F_0'$
0.300	0.295 5987	9566	16 56 11.60	197.32	0.350	0.343 0655	9417	19 39 22.31	194.25
.301	.296 5552	9563	16 59 28.89	197.26	.351	.344 0071	9414	19 42 36.55	194.18
.302	.297 5114	9561	17 02 46.13	197.20	.352	.344 9483	9411	19 45 50.70	194.11
.303	.298 4673	9558	17 05 03.30	197.15	.353	.345 8893	9408	19 49 04.78	194.05
.304	.299 4229	9555	17 08 20.42	197.09	.354	.346 8299	9405	19 52 18.80	193.98
0.305	0.300 3783	9552	17 12 37.48	197.03	0.355	0.347 7702	9401	19 55 32.75	193.92
.306	.301 3331	9549	17 15 54.48	196.97	.356	.348 7101	9398	19 58 46.63	193.85
.307	.302 2882	9547	17 19 11.42	196.91	.357	.349 6498	9395	20 02 00.45	193.78
.308	.303 2427	9544	17 22 28.30	196.85	.358	.350 5891	9392	20 05 14.20	193.72
.309	.304 1969	9541	17 25 45.12	196.79	.359	.351 5281	9388	20 08 27.88	193.65
0.310	0.305 1509	9538	17 29 01.89	196.74	0.360	0.352 4668	9385	20 11 41.50	193.58
.311	.306 1045	9535	17 32 18.60	196.68	.361	.353 4052	9382	20 14 55.05	193.52
.312	.307 0579	9532	17 35 35.24	196.62	.362	.354 3432	9378	20 18 08.54	193.45
.313	.308 0110	9529	17 38 51.83	196.56	.363	.355 2809	9375	20 21 21.95	193.38
.314	.308 9638	9525	17 42 08.36	196.50	.364	.356 2183	9372	20 24 35.30	193.32
0.315	0.309 9163	9521	17 45 24.83	196.44	0.365	0.357 1554	9369	20 27 48.59	193.25
.316	.310 8685	9518	17 48 41.23	196.38	.366	.358 0921	9366	20 31 01.80	193.18
.317	.311 8204	9515	17 51 57.58	196.32	.367	.359 0285	9362	20 34 14.95	193.11
.318	.312 7721	9512	17 55 13.87	196.26	.368	.359 9646	9359	20 37 28.03	193.05
.319	.313 7234	9512	17 58 30.10	196.20	.369	.360 9003	9356	20 40 41.04	192.98
0.320	0.314 6744	9509	18 01 46.26	196.14	0.370	0.361 8358	9352	20 43 53.98	192.91
.321	.315 6252	9506	18 05 02.32	196.08	.371	.362 7708	9349	20 47 06.88	192.84
.322	.316 5757	9503	18 08 18.42	196.01	.372	.363 7056	9346	20 50 19.66	192.77
.323	.317 5258	9500	18 11 34.40	195.95	.373	.364 6400	9343	20 53 32.40	192.70
.324	.318 4757	9497	18 14 50.32	195.89	.374	.365 5741	9339	20 56 45.07	192.63
0.325	0.319 4252	9494	18 18 06.19	195.83	0.375	0.366 5078	9336	20 59 57.67	192.57
.326	.320 3745	9491	18 21 21.99	195.77	.376	.367 4413	9332	21 03 10.20	192.50
.327	.321 3235	9488	18 24 37.72	195.71	.377	.368 3743	9329	21 06 22.66	192.43
.328	.322 2721	9485	18 27 53.40	195.65	.378	.369 3071	9326	21 09 35.05	192.36
.329	.323 2205	9482	18 31 09.02	195.58	.379	.370 2395	9322	21 12 47.38	192.29
0.330	0.324 1686	9479	18 34 24.57	195.52	0.380	0.371 1716	9319	21 15 59.63	192.22
.331	.325 1164	9476	18 37 40.06	195.46	.381	.372 1031	9316	21 19 11.82	192.15
.332	.326 0638	9473	18 40 55.49	195.40	.382	.373 0347	9312	21 22 23.93	192.08
.333	.327 0110	9470	18 44 10.85	195.33	.383	.373 9658	9309	21 25 35.97	192.01
.334	.327 9578	9467	18 47 26.16	195.27	.384	.374 8965	9305	21 28 47.95	191.94
0.335	0.328 9044	9464	18 50 41.40	195.21	0.385	0.375 8268	9302	21 31 59.85	191.87
.336	.329 8506	9461	18 53 56.52	195.15	.386	.376 7569	9299	21 35 11.68	191.80
.337	.330 7965	9458	18 57 11.60	195.08	.387	.377 6865	9295	21 38 23.45	191.73
.338	.331 7422	9455	19 00 26.74	195.02	.388	.378 6159	9292	21 41 35.14	191.66
.339	.332 6875	9452	19 03 41.72	194.95	.389	.379 5449	9288	21 44 46.76	191.59
0.340	0.333 6325	9449	19 06 56.65	194.89	0.390	0.380 4736	9285	21 47 58.31	191.51
.341	.334 5772	9445	19 10 11.50	194.83	.391	.381 4019	9281	21 51 09.79	191.44
.342	.335 5216	9442	19 13 26.30	194.76	.392	.382 3299	9278	21 54 21.20	191.37
.343	.336 4657	9439	19 16 41.03	194.70	.393	.383 2575	9275	21 57 32.53	191.30
.344	.337 4095	9436	19 19 55.70	194.63	.394	.384 1848	9271	22 00 43.80	191.23
0.345	0.338 3529	9433	19 23 10.30	194.57	0.395	0.385 1117	9268	22 03 54.99	191.16
.346	.339 2961	9430	19 26 24.84	194.51	.396	.386 0383	9264	22 07 06.11	191.09
.347	.340 2389	9427	19 29 39.31	194.44	.397	.386 9645	9261	22 10 17.16	191.01
.348	.341 1814	9424	19 32 53.72	194.38	.398	.387 8904	9257	22 13 28.14	190.94
.349	.342 1236	9420	19 36 08.06	194.31	.399	.388 8159	9254	22 16 39.04	190.87
0.350	0.343 0655	9417	19 39 22.31	194.25	0.400	0.389 7411	9250	22 19 49.88	190.80
u	$2 \ln^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	u	$2 \ln^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$



The Gudermannian.

$u$	$\text{gd } u$	$\text{sech } u$	$\text{gd } u$	$\text{sech } u$	$u$	$\text{gd } u$	$\text{sech } u$	$\text{gd } u$	$\text{sech } u$
0.400	0.389 7411	0.450	22 19 40.88	100.80	0.450	0.438 5383	0.000	0 52 00.44	187.01
0.401	0.390 6660	0.451	22 33 00.61	100.73	0.451	0.440 4153	0.003	0 50 23.34	187.03
0.402	0.391 5904	0.452	22 26 11.32	100.65	0.452	0.442 3511	0.005	0 50 30.90	187.05
0.403	0.392 5146	0.453	22 20 21.01	100.58	0.453	0.444 2871	0.008	0 50 37.01	187.07
0.404	0.393 4383	0.454	22 32 32.48	100.51	0.454	0.446 1621	0.011	0 50 43.24	187.09
0.405	0.394 3618	0.455	22 35 42.05	100.43	0.455	0.448 0673	0.012	0 50 49.39	187.11
0.406	0.395 2848	0.456	22 38 53.35	100.36	0.456	0.449 9748	0.013	0 50 55.60	187.13
0.407	0.396 2075	0.457	22 42 03.67	100.30	0.457	0.451 8750	0.014	0 51 01.46	187.15
0.408	0.397 1300	0.458	22 45 13.02	100.24	0.458	0.453 7707	0.016	0 51 07.87	187.17
0.409	0.398 0519	0.459	22 48 21.09	100.17	0.459	0.455 6611	0.017	0 51 13.90	187.19
0.410	0.398 9735	0.460	22 51 31.10	100.06	0.460	0.457 5481	0.018	0 51 19.40	187.21
0.411	0.399 8948	0.461	22 54 41.22	100.00	0.461	0.459 4311	0.019	0 51 25.03	187.23
0.412	0.400 8157	0.462	22 57 51.48	100.03	0.462	0.461 3122	0.020	0 51 30.71	187.25
0.413	0.401 7363	0.463	23 01 01.00	100.01	0.463	0.463 1912	0.021	0 51 36.42	187.27
0.414	0.402 6565	0.464	23 04 11.86	100.27	0.464	0.465 0711	0.022	0 51 42.16	187.29
0.415	0.403 5763	0.465	23 07 23.50	100.60	0.465	0.466 9531	0.023	0 51 48.04	187.31
0.416	0.404 4953	0.466	23 10 33.25	100.62	0.466	0.468 8371	0.024	0 51 53.96	187.33
0.417	0.405 4140	0.467	23 13 42.81	100.51	0.467	0.470 7230	0.025	0 51 59.93	187.35
0.418	0.406 3332	0.468	23 16 52.41	100.42	0.468	0.472 6101	0.026	0 52 05.94	187.37
0.419	0.407 2521	0.469	23 20 01.77	100.30	0.469	0.474 4981	0.027	0 52 11.99	187.39
0.420	0.408 1701	0.470	23 23 11.11	100.32	0.470	0.476 3871	0.028	0 52 18.07	187.41
0.421	0.409 0878	0.471	23 26 30.41	100.24	0.471	0.478 2781	0.029	0 52 24.18	187.43
0.422	0.410 0051	0.472	23 29 50.63	100.17	0.472	0.480 1711	0.030	0 52 30.32	187.45
0.423	0.410 9230	0.473	24 32 03.75	100.09	0.473	0.482 0661	0.031	0 52 36.49	187.47
0.424	0.411 8403	0.474	24 35 17.81	100.03	0.474	0.483 9631	0.032	0 52 42.69	187.49
0.425	0.412 7568	0.475	24 38 30.70	100.11	0.475	0.485 8621	0.033	0 52 48.92	187.51
0.426	0.413 6726	0.476	24 41 43.60	100.20	0.476	0.487 7631	0.034	0 52 55.18	187.53
0.427	0.414 5881	0.477	24 44 55.53	100.29	0.477	0.489 6661	0.035	0 53 01.47	187.55
0.428	0.415 5032	0.478	24 48 07.22	100.21	0.478	0.491 5711	0.036	0 53 07.79	187.57
0.429	0.416 4179	0.479	24 51 18.95	100.04	0.479	0.493 4781	0.037	0 53 14.14	187.59
0.430	0.417 3323	0.480	24 54 30.55	100.36	0.480	0.495 3871	0.038	0 53 20.52	187.61
0.431	0.418 2464	0.481	24 57 40.92	100.39	0.481	0.497 2981	0.039	0 53 26.93	187.63
0.432	0.419 1600	0.482	24 60 52.53	100.41	0.482	0.499 2111	0.040	0 53 33.37	187.65
0.433	0.420 0731	0.483	24 64 03.80	100.33	0.483	0.501 1261	0.041	0 53 39.84	187.67
0.434	0.420 9850	0.484	24 67 14.13	100.26	0.484	0.503 0431	0.042	0 53 46.34	187.69
0.435	0.421 8968	0.485	24 70 24.40	100.18	0.485	0.504 9621	0.043	0 53 52.87	187.71
0.436	0.422 8083	0.486	24 73 34.51	100.10	0.486	0.506 8831	0.044	0 53 59.43	187.73
0.437	0.423 7194	0.487	24 76 44.53	100.02	0.487	0.508 8061	0.045	0 54 06.02	187.75
0.438	0.424 6303	0.488	24 79 54.50	100.05	0.488	0.510 7311	0.046	0 54 12.64	187.77
0.439	0.425 5408	0.489	24 83 04.30	100.32	0.489	0.512 6581	0.047	0 54 19.29	187.79
0.440	0.426 4511	0.490	24 86 13.83	100.70	0.490	0.514 5871	0.048	0 54 25.97	187.81
0.441	0.427 3616	0.491	24 89 23.03	100.71	0.491	0.516 5181	0.049	0 54 32.68	187.83
0.442	0.428 2715	0.492	24 92 31.75	100.61	0.492	0.518 4511	0.050	0 54 39.42	187.85
0.443	0.429 1810	0.493	24 95 40.35	100.50	0.493	0.520 3861	0.051	0 54 46.19	187.87
0.444	0.430 0901	0.494	24 98 48.82	100.38	0.494	0.522 3231	0.052	0 54 52.99	187.89
0.445	0.431 0000	0.495	24 10 10.31	100.30	0.495	0.524 2621	0.053	0 54 59.82	187.91
0.446	0.431 9094	0.496	24 13 20.67	100.34	0.496	0.526 2031	0.054	0 55 06.68	187.93
0.447	0.432 8172	0.497	24 16 30.96	100.31	0.497	0.528 1461	0.055	0 55 13.57	187.95
0.448	0.433 7243	0.498	24 19 41.10	100.27	0.498	0.530 0911	0.056	0 55 20.49	187.97
0.449	0.434 6310	0.499	24 22 51.29	100.09	0.499	0.532 0381	0.057	0 55 27.44	187.99
0.450	0.435 5388	0.500	24 26 01.34	100.01	0.500	0.534 0000	0.058	0 55 34.42	188.01
$u$	$2 \tan^{-1}(\text{sech } u) - \frac{\pi}{2}$	$\text{sech } u$	$2 \tan^{-1}(\text{sech } u) - 90^\circ$	$\text{sech } u$	$u$	$2 \tan^{-1}(\text{sech } u) - \frac{\pi}{2}$	$\text{sech } u$	$2 \tan^{-1}(\text{sech } u) - 90^\circ$	$\text{sech } u$

The Gudermannian.

u	gd u	$\omega F_0'$	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	gd u	$\omega F_0'$
0.500	0.480 3811	8868	27 31 25.71	182.92	0.550	0.521 1996	8657	30 02 03.92	178.57
.501	.481 2677	8861	27 31 28.59	182.83	.551	.525 0651	8653	30 05 02.45	178.48
.502	.482 1530	8850	27 37 31.38	182.75	.552	.525 9302	8649	30 08 00.88	178.39
.503	.483 0397	8856	27 40 31.00	182.67	.553	.526 7918	8644	30 10 59.23	178.30
.504	.483 9251	8852	27 43 30.71	182.58	.554	.527 6590	8640	30 13 57.48	178.21
0.505	0.484 8100	8848	27 46 30.25	182.50	0.555	0.528 5228	8636	30 16 55.65	178.12
.506	.485 6946	8841	27 49 41.70	182.41	.556	.529 3891	8631	30 19 53.72	178.03
.507	.486 5787	8839	27 52 41.07	182.33	.557	.530 2490	8627	30 22 51.71	177.94
.508	.487 4635	8835	27 55 46.35	182.24	.558	.531 1115	8623	30 25 49.60	177.85
.509	.488 3458	8831	27 58 48.55	182.15	.559	.531 9735	8618	30 28 47.41	177.76
0.510	0.489 2287	8827	28 01 50.66	182.07	0.560	0.532 8351	8614	30 31 45.12	177.67
.511	.490 1112	8823	28 04 52.69	181.98	.561	.533 6962	8609	30 34 42.75	177.58
.512	.490 9933	8819	28 07 51.63	181.90	.562	.534 5599	8605	30 37 40.28	177.49
.513	.491 8749	8814	28 10 56.48	181.81	.563	.535 4172	8601	30 40 37.73	177.40
.514	.492 7562	8810	28 13 58.25	181.73	.564	.536 2771	8596	30 43 35.08	177.31
0.515	0.493 6370	8806	28 16 59.04	181.64	0.565	0.537 1365	8592	30 46 32.35	177.22
.516	.494 5174	8802	28 20 01.53	181.55	.566	.537 9954	8587	30 49 29.52	177.13
.517	.495 3974	8798	28 23 03.04	181.47	.567	.538 8539	8583	30 52 26.60	177.04
.518	.496 2769	8794	28 26 04.47	181.38	.568	.539 7120	8579	30 55 23.59	176.95
.519	.497 1561	8789	28 29 05.81	181.29	.569	.540 5696	8574	30 58 20.49	176.85
0.520	0.498 0348	8785	28 32 07.06	181.21	0.570	0.541 4268	8570	31 01 17.30	176.76
.521	.498 9131	8781	28 35 08.22	181.12	.571	.542 2836	8565	31 04 14.02	176.67
.522	.499 7910	8777	28 38 09.30	181.04	.572	.543 1399	8561	31 07 10.65	176.58
.523	.500 6685	8773	28 41 10.39	180.95	.573	.543 9958	8556	31 10 07.18	176.49
.524	.501 5456	8768	28 44 11.20	180.86	.574	.544 8512	8552	31 13 03.63	176.40
0.525	0.502 4223	8764	28 47 12.01	180.77	0.575	0.545 7062	8548	31 15 59.98	176.31
.526	.503 2984	8760	28 50 12.75	180.69	.576	.546 5607	8543	31 18 56.24	176.22
.527	.504 1742	8756	28 53 13.39	180.60	.577	.547 4148	8539	31 21 52.41	176.12
.528	.505 0495	8752	28 56 13.95	180.51	.578	.548 2685	8534	31 24 48.49	176.03
.529	.505 9245	8747	28 59 14.41	180.43	.579	.549 1217	8530	31 27 44.47	175.94
0.530	0.506 8000	8743	29 02 14.80	180.34	0.580	0.549 9744	8525	31 30 40.37	175.85
.531	.507 6731	8739	29 05 15.09	180.25	.581	.550 8267	8521	31 33 36.17	175.76
.532	.508 5468	8735	29 08 15.30	180.16	.582	.551 6786	8516	31 36 31.88	175.66
.533	.509 4200	8730	29 11 15.42	180.07	.583	.552 5300	8512	31 39 27.50	175.57
.534	.510 2938	8726	29 14 15.45	179.99	.584	.553 3810	8508	31 42 23.03	175.48
0.535	0.511 1652	8722	29 17 15.39	179.90	0.585	0.554 2315	8503	31 45 18.46	175.39
.536	.512 0372	8717	29 20 15.24	179.81	.586	.555 0816	8499	31 48 13.80	175.30
.537	.512 9087	8713	29 23 15.04	179.73	.587	.555 9313	8494	31 51 09.05	175.20
.538	.513 7798	8709	29 26 14.69	179.63	.588	.556 7804	8490	31 54 04.21	175.11
.539	.514 6505	8705	29 29 14.28	179.55	.589	.557 6292	8485	31 56 59.27	175.02
0.540	0.515 5207	8700	29 32 13.78	179.46	0.590	0.558 4775	8481	31 59 54.25	174.93
.541	.516 3905	8696	29 35 13.20	179.37	.591	.559 3253	8476	32 02 49.13	174.83
.542	.517 2599	8692	29 38 12.52	179.28	.592	.560 1727	8472	32 05 43.91	174.74
.543	.518 1289	8687	29 41 11.76	179.19	.593	.561 0196	8467	32 08 38.61	174.65
.544	.518 9974	8683	29 44 10.91	179.10	.594	.561 8661	8463	32 11 33.21	174.55
0.545	0.519 8655	8679	29 47 09.96	179.01	0.595	0.562 7122	8458	32 14 27.71	174.46
.546	.520 7332	8675	29 50 08.93	178.93	.596	.563 5577	8454	32 17 22.13	174.37
.547	.521 6004	8670	29 53 07.81	178.84	.597	.564 4029	8449	32 20 16.45	174.27
.548	.522 4673	8666	29 56 06.61	178.75	.598	.565 2476	8445	32 23 10.68	174.18
.549	.523 3339	8662	29 59 05.31	178.66	.599	.566 0918	8440	32 26 04.81	174.09
0.550	0.524 1996	8657	30 02 03.92	178.57	0.600	0.566 9356	8436	32 28 58.85	173.99
u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - \pi$	$\omega \operatorname{sech} u$	u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - \pi$	$\omega \operatorname{sech} u$

The Gndermannian.

$\phi$	$\sin \phi$	$\cos \phi$	$\tan \phi$	$\sec \phi$	$\phi$	$\sin \phi$	$\cos \phi$	$\tan \phi$	$\sec \phi$
0.600	0.566 9356	8136	32 28 58.85	173.99	0.650	0.608 5408	8295	34 52 00.34	160.24
.001	.567 7789	8131	32 31 52.80	173.90	.051	.609 3000	8290	34 54 49.52	160.14
.002	.568 6238	8126	32 34 46.66	173.81	.052	.610 1798	8285	34 57 38.62	160.04
.003	.569 4692	8122	32 37 40.42	173.71	.053	.610 9891	8280	35 00 27.61	160.05
.004	.570 3061	8117	32 40 34.09	173.62	.054	.611 8179	8275	35 03 16.51	160.85
0.605	0.571 1476	8113	32 43 27.66	173.53	0.655	0.612 1463	8281	35 06 05.31	160.75
.006	.572 9882	8108	32 46 21.14	173.43	.056	.613 4542	8277	35 08 54.00	160.66
.007	.573 8293	8104	32 49 14.52	173.34	.057	.614 2710	8272	35 11 42.62	160.56
.008	.574 6701	8100	32 52 07.82	173.24	.058	.615 9885	8267	35 14 31.13	160.46
.009	.575 5091	8095	32 55 01.01	173.15	.059	.615 9051	8263	35 17 19.54	160.36
0.610	0.575 3481	8100	32 57 54.12	173.06	0.660	0.616 7211	8258	35 20 07.30	160.27
.011	.576 1871	8085	33 00 47.13	172.96	.061	.617 5380	8253	35 22 55.08	160.17
.012	.577 0255	8081	33 03 40.04	172.87	.062	.618 3547	8248	35 25 41.20	160.07
.013	.577 8633	8076	33 06 32.86	172.77	.063	.619 1663	8244	35 28 27.22	160.07
.014	.578 7007	8072	33 09 25.59	172.68	.064	.619 9801	8239	35 31 13.14	160.88
0.615	0.579 5377	8067	33 12 18.22	172.59	0.665	0.620 7941	8234	35 34 02.07	160.78
.016	.580 3741	8063	33 15 10.76	172.49	.066	.621 6073	8229	35 36 55.20	160.68
.017	.581 2102	8058	33 18 03.20	172.40	.067	.622 4200	8225	35 39 43.31	160.58
.018	.582 0457	8053	33 20 55.85	172.30	.068	.623 2322	8220	35 42 36.19	160.49
.019	.582 8809	8049	33 23 47.81	172.21	.069	.624 0440	8215	35 45 18.41	160.39
0.620	0.583 7155	8044	33 26 39.97	172.11	0.670	0.624 8553	8210	35 48 05.65	160.29
.021	.584 5497	8040	33 29 32.03	172.02	.071	.625 6661	8206	35 50 52.80	160.19
.022	.585 3831	8035	33 32 24.00	171.92	.072	.626 4761	8201	35 53 40.03	160.09
.023	.586 2167	8030	33 35 15.87	171.83	.073	.627 2863	8196	35 56 27.03	160.00
.024	.587 0495	8026	33 38 07.65	171.73	.074	.628 0956	8191	35 59 14.03	160.00
0.625	0.587 8819	8021	33 40 59.31	171.64	0.675	0.628 9046	8187	36 02 00.88	160.80
.026	.588 7137	8017	33 43 50.93	171.54	.076	.629 7110	8182	36 04 47.03	160.70
.027	.589 5452	8012	33 46 42.42	171.45	.077	.630 5169	8177	36 07 33.34	160.60
.028	.590 3761	8007	33 49 33.82	171.35	.078	.631 3234	8172	36 10 20.34	160.51
.029	.591 2066	8003	33 52 25.12	171.26	.079	.632 1294	8168	36 13 07.29	160.41
0.630	0.592 0367	8008	33 55 16.33	171.16	0.680	0.632 9320	8163	36 15 53.05	160.31
.031	.592 8662	8003	33 58 07.41	171.06	.081	.633 7340	8158	36 18 39.01	160.21
.032	.593 6954	8008	34 00 58.46	170.97	.082	.634 5360	8153	36 21 25.07	160.11
.033	.594 5240	8003	34 03 49.28	170.87	.083	.635 3387	8149	36 24 11.14	160.01
.034	.595 3522	8008	34 06 40.20	170.78	.084	.636 1413	8144	36 26 58.10	160.91
0.635	0.596 1800	8275	34 09 30.93	170.68	0.685	0.636 9428	8139	36 29 44.07	160.82
.036	.597 0072	8270	34 12 21.50	170.59	.086	.637 7441	8134	36 32 30.24	160.72
.037	.597 8339	8266	34 15 12.10	170.49	.087	.638 5453	8129	36 35 16.41	160.63
.038	.598 6603	8261	34 18 02.51	170.39	.088	.639 3460	8125	36 38 02.68	160.53
.039	.599 4861	8256	34 20 52.89	170.30	.089	.640 1462	8120	36 40 49.45	160.42
0.640	0.600 3115	8252	34 23 43.14	170.20	0.690	0.640 9410	8115	36 43 34.32	160.32
.041	.601 1361	8247	34 26 33.29	170.11	.091	.641 7333	8110	36 46 19.00	160.22
.042	.601 9609	8242	34 29 23.35	170.01	.092	.642 5259	8106	36 49 03.27	160.13
.043	.602 7849	8238	34 32 13.31	169.91	.093	.643 3181	8101	36 51 47.34	160.04
.044	.603 6081	8233	34 35 03.17	169.82	.094	.644 1102	8097	36 54 31.43	160.93
0.645	0.604 4315	8228	34 37 52.91	169.72	0.695	0.644 9035	8092	36 57 17.20	160.83
.046	.605 2541	8224	34 40 42.61	169.62	.096	.645 6961	8088	37 00 01.08	160.73
.047	.606 0762	8219	34 43 32.19	169.53	.097	.646 4888	8083	37 02 46.06	160.63
.048	.606 8979	8214	34 46 21.67	169.43	.098	.647 2817	8079	37 05 31.31	160.53
.049	.607 7190	8210	34 49 11.05	169.33	.099	.648 0741	8074	37 08 15.22	160.43
0.650	0.608 5398	8205	34 52 00.34	169.24	0.700	0.648 9721	8069	37 11 00.10	160.33
$u$	$2 \tan^{-1}(\sec u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(\sec u) - 90^\circ$	$\sec u$	$u$	$2 \tan^{-1}(\sec u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(\sec u) - 90^\circ$	$\sec u$

The Gudermannian.

$u$	$gd\ u$	$\omega F_u$	$gd\ u$	$\omega F_u$	$u$	$gd\ u$	$\omega F_u$	$gd\ u$	$\omega F_u$
0.700	0.648 0721	7007	37 11 00.10	161.33	0.750	0.688 2014	7724	39 25 51.72	159.32
.701	.649 7683	7008	37 13 41.38	161.33	.751	.688 9735	7719	39 28 30.98	159.22
.702	.650 5645	7057	37 16 28.57	161.13	.752	.689 7451	7714	39 31 10.15	159.11
.703	.651 3600	7058	37 19 12.65	161.03	.753	.690 5163	7709	39 33 49.21	159.01
.704	.652 1550	7048	37 21 50.63	161.93	.754	.691 2870	7704	39 36 28.18	158.91
0.705	0.653 0496	7043	37 24 40.52	163.84	0.755	0.692 0572	7699	39 39 07.04	158.81
.706	.653 7436	7038	37 27 31.31	163.74	.756	.692 8209	7694	39 41 45.80	158.71
.707	.654 5372	7033	37 30 07.99	163.64	.757	.693 5951	7689	39 44 24.46	158.61
.708	.655 3303	7028	37 32 51.58	163.54	.758	.694 3648	7685	39 47 03.01	158.51
.709	.656 1229	7024	37 35 35.06	163.44	.759	.695 1330	7680	39 49 41.47	158.40
0.710	0.656 9150	7019	37 38 18.45	163.34	0.760	0.695 9007	7675	39 52 19.82	158.30
.711	.657 7067	7014	37 41 01.74	163.24	.761	.696 6679	7670	39 54 58.07	158.20
.712	.658 4978	7009	37 43 44.92	163.14	.762	.697 4347	7665	39 57 36.23	158.10
.713	.659 2885	7004	37 46 28.01	163.04	.763	.698 2009	7660	40 00 14.28	158.00
.714	.660 0787	7000	37 49 11.00	162.94	.764	.698 9667	7655	40 02 52.22	157.90
0.715	0.660 8684	7805	37 51 53.89	162.84	0.765	0.699 7319	7650	40 05 30.07	157.80
.716	.661 6576	7800	37 54 36.68	162.74	.766	.700 4967	7645	40 08 07.81	157.69
.717	.662 4463	7835	37 57 19.30	162.64	.767	.701 2510	7640	40 10 45.46	157.59
.718	.663 2346	7880	38 00 01.95	162.54	.768	.702 0248	7635	40 13 23.00	157.49
.719	.664 0223	7875	38 02 44.41	162.44	.769	.702 7880	7630	40 16 00.44	157.39
0.720	0.664 8096	7870	38 05 26.83	162.34	0.770	0.703 5508	7625	40 18 37.78	157.29
.721	.665 5964	7865	38 08 09.11	162.24	.771	.704 3131	7620	40 21 15.01	157.19
.722	.666 3827	7861	38 10 51.30	162.14	.772	.705 0750	7616	40 23 52.15	157.08
.723	.667 1685	7856	38 13 33.39	162.04	.773	.705 8363	7611	40 26 29.18	156.98
.724	.667 9539	7851	38 16 15.37	161.94	.774	.706 5971	7606	40 29 06.11	156.88
0.725	0.668 7387	7846	38 18 57.26	161.84	0.775	0.707 3574	7601	40 31 42.94	156.78
.726	.669 5231	7841	38 21 39.05	161.74	.776	.708 1173	7596	40 34 19.67	156.68
.727	.670 3069	7836	38 24 20.73	161.64	.777	.708 8756	7591	40 36 56.20	156.57
.728	.671 0903	7831	38 27 02.32	161.54	.778	.709 6353	7586	40 39 32.82	156.47
.729	.671 8732	7827	38 29 43.80	161.43	.779	.710 3938	7581	40 42 09.24	156.37
0.730	0.672 6556	7822	38 32 25.19	161.33	0.780	0.711 1516	7576	40 44 45.56	156.27
.731	.673 4376	7817	38 35 06.47	161.23	.781	.711 9090	7571	40 47 21.77	156.17
.732	.674 2190	7812	38 37 47.65	161.13	.782	.712 6659	7566	40 49 57.89	156.06
.733	.675 0000	7807	38 40 28.74	161.03	.783	.713 4223	7561	40 52 33.90	155.96
.734	.675 7801	7802	38 43 09.72	160.93	.784	.714 1781	7556	40 55 09.81	155.86
0.735	0.676 5604	7797	38 45 50.50	160.83	0.785	0.714 9335	7551	40 57 45.62	155.76
.736	.677 3397	7792	38 48 31.38	160.73	.786	.715 6884	7546	41 00 21.33	155.66
.737	.678 1180	7788	38 51 12.05	160.63	.787	.716 4428	7541	41 02 56.94	155.55
.738	.678 8971	7783	38 53 52.61	160.53	.788	.717 1967	7537	41 05 32.44	155.45
.739	.679 6754	7778	38 56 33.12	160.43	.789	.717 9501	7532	41 08 07.84	155.35
0.740	0.680 4530	7773	38 59 13.50	160.33	0.790	0.718 7030	7527	41 10 43.14	155.25
.741	.681 2300	7768	39 01 53.77	160.23	.791	.719 4554	7522	41 13 18.33	155.15
.742	.682 0065	7763	39 04 33.95	160.13	.792	.720 2071	7517	41 15 53.43	155.04
.743	.682 7826	7758	39 07 14.02	160.02	.793	.720 9588	7512	41 18 28.42	154.94
.744	.683 5582	7753	39 09 54.00	159.92	.794	.721 7097	7507	41 21 03.31	154.84
0.745	0.684 3333	7748	39 12 33.87	159.82	0.795	0.722 4601	7502	41 23 38.10	154.74
.746	.685 1079	7744	39 15 13.61	159.72	.796	.723 2101	7497	41 26 12.78	154.63
.747	.685 8820	7739	39 17 53.31	159.62	.797	.723 9595	7492	41 28 47.36	154.53
.748	.686 6556	7734	39 20 32.88	159.52	.798	.724 7084	7487	41 31 21.84	154.43
.749	.687 4287	7729	39 23 12.35	159.42	.799	.725 4569	7482	41 33 56.22	154.33
0.750	0.688 2014	7724	39 25 51.72	159.32	0.800	0.726 2048	7477	41 36 30.50	154.22
$u$	$2 \ln^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \ln^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \ln^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

u	gd u	$\omega F_0'$	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	gd u	$\omega F_0'$
0.800	0.726 20.48	7477	41 36 30.50	154.22	0.850	0.762 9677	7228	43 42 53.38	149.09
.801	.726 9523	7472	41 39 04.67	154.12	.851	.763 6902	7223	43 45 22.41	148.68
.802	.727 6692	7467	41 41 38.74	154.02	.852	.764 4122	7218	43 47 51.34	148.88
.803	.728 4457	7462	41 44 12.71	153.92	.853	.765 1338	7213	43 50 20.17	148.78
.804	.729 1916	7457	41 46 46.57	153.81	.854	.765 8548	7208	43 52 48.89	148.67
0.805	0.729 9371	7452	41 49 20.34	153.71	0.855	0.766 5754	7203	43 55 17.52	148.57
.806	.730 6821	7447	41 51 54.00	153.61	.856	.767 2954	7198	43 57 46.04	148.47
.807	.731 4256	7442	41 54 27.56	153.51	.857	.768 0149	7193	44 00 14.45	148.36
.808	.732 1705	7437	41 57 01.01	153.40	.858	.768 7340	7188	44 02 42.76	148.26
.809	.732 9140	7432	41 59 34.36	153.30	.859	.769 4525	7183	44 05 10.97	148.16
0.810	0.733 6570	7427	42 02 07.62	153.20	0.860	0.770 1706	7178	44 07 39.08	148.05
.811	.734 3995	7422	42 04 40.76	153.10	.861	.770 8881	7173	44 10 07.08	147.95
.812	.735 1414	7417	42 07 13.81	152.99	.862	.771 6051	7168	44 12 34.98	147.85
.813	.735 8829	7412	42 09 46.75	152.89	.863	.772 3217	7163	44 15 02.78	147.75
.814	.736 6239	7407	42 12 19.59	152.79	.864	.773 0377	7158	44 17 30.48	147.64
0.815	0.737 3644	7402	42 14 52.33	152.69	0.865	0.773 7533	7153	44 19 58.07	147.54
.816	.738 1044	7397	42 17 24.06	152.58	.866	.774 4683	7148	44 22 25.56	147.44
.817	.738 8439	7392	42 19 57.50	152.48	.867	.775 1829	7143	44 24 52.94	147.33
.818	.739 5829	7387	42 22 29.93	152.38	.868	.775 8959	7138	44 27 20.22	147.23
.819	.740 3214	7383	42 25 02.25	152.28	.869	.776 6104	7133	44 29 47.40	147.13
0.820	0.741 0594	7378	42 27 34.48	152.17	0.870	0.777 3235	7128	44 32 14.48	147.02
.821	.741 7959	7373	42 30 06.60	152.07	.871	.778 0360	7123	44 34 41.45	146.92
.822	.742 5339	7368	42 32 38.62	151.97	.872	.778 7481	7118	44 37 08.32	146.82
.823	.743 2704	7363	42 35 10.53	151.85	.873	.779 4596	7113	44 39 35.09	146.71
.824	.744 0064	7358	42 37 42.34	151.76	.874	.780 1707	7108	44 42 01.75	146.61
0.825	0.744 7420	7353	42 40 14.05	151.66	0.875	0.780 8812	7103	44 44 28.31	146.51
.826	.745 4770	7348	42 42 45.66	151.55	.876	.781 5912	7098	44 46 54.77	146.41
.827	.746 2115	7343	42 45 17.17	151.45	.877	.782 3008	7093	44 49 21.12	146.30
.828	.746 9455	7338	42 47 48.57	151.35	.878	.783 0098	7088	44 51 47.37	146.20
.829	.747 6790	7333	42 50 19.87	151.25	.879	.783 7184	7083	44 54 13.52	146.10
0.830	0.748 4120	7328	42 52 51.06	151.14	0.880	0.784 4264	7078	44 56 39.56	145.99
.831	.749 1446	7323	42 55 22.16	151.04	.881	.785 1340	7073	44 59 05.50	145.89
.832	.749 8766	7318	42 57 53.15	150.94	.882	.785 8410	7068	45 01 31.34	145.79
.833	.750 6081	7313	43 00 24.04	150.84	.883	.786 5476	7063	45 03 57.08	145.68
.834	.751 3391	7308	43 02 54.82	150.73	.884	.787 2536	7058	45 05 22.71	145.58
0.835	0.752 0697	7303	43 05 25.50	150.63	0.885	0.787 9591	7053	45 08 48.24	145.48
.836	.752 7997	7298	43 07 56.08	150.53	.886	.788 6642	7048	45 11 13.66	145.37
.837	.753 5292	7293	43 10 26.56	150.42	.887	.789 3687	7043	45 13 38.99	145.27
.838	.754 2582	7288	43 12 56.93	150.32	.888	.790 0728	7038	45 16 04.21	145.17
.839	.754 9868	7283	43 15 27.20	150.22	.889	.790 7763	7033	45 18 29.32	145.06
0.840	0.755 7148	7278	43 17 57.37	150.12	0.890	0.791 4794	7028	45 20 54.34	144.96
.841	.756 4423	7273	43 20 27.43	150.01	.891	.792 1819	7023	45 23 19.25	144.86
.842	.757 1694	7268	43 22 57.39	149.91	.892	.792 8839	7018	45 25 44.05	144.75
.843	.757 8959	7263	43 25 27.25	149.81	.893	.793 5855	7013	45 28 08.76	144.65
.844	.758 6219	7258	43 27 57.01	149.70	.894	.794 2865	7008	45 30 33.36	144.55
0.845	0.759 3475	7253	43 30 26.66	149.60	0.895	0.794 9871	7003	45 32 57.85	144.45
.846	.760 0725	7248	43 32 56.21	149.50	.896	.795 6871	6998	45 35 22.25	144.34
.847	.760 7970	7243	43 35 25.65	149.39	.897	.796 3857	6993	45 37 46.54	144.24
.848	.761 5211	7238	43 37 55.00	149.29	.898	.797 0857	6988	45 40 10.73	144.14
.849	.762 2446	7233	43 40 24.24	149.19	.899	.797 7843	6983	45 42 34.81	144.03
0.850	0.762 9677	7228	43 42 53.38	149.09	0.900	0.798 4823	6978	45 44 58.80	143.92
u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

$\alpha$	$\sin \alpha$	$\omega F_1'$	$\sin \alpha$	$\omega F_1'$	$u$	$\sin u$	$\omega F_2'$	$\sin u$	$\omega F_2'$
0.000	0.728 48.33	6078	45 44 58.80	143.93	0.950	0.832 7479	6728	47 42 46.58	138.78
.001	.700 1708	6073	45 47 22.67	143.83	.951	.843 4305	6723	47 45 05.31	138.68
.002	.709 8760	6068	45 49 46.45	143.72	.952	.844 0326	6719	47 47 23.94	138.58
.003	.700 5741	6063	45 52 10.12	143.62	.953	.841 7642	6714	47 49 42.47	138.48
.004	.801 2695	6058	45 54 33.69	143.52	.954	.835 4353	6709	47 52 00.89	138.37
0.005	0.801 0650	6053	45 56 57.16	143.42	0.955	0.836 1050	6704	47 54 19.22	138.27
.006	.802 6601	6048	45 59 20.52	143.31	.956	.836 7760	6699	47 56 37.41	138.17
.007	.803 3546	6043	46 01 43.78	143.21	.957	.837 4456	6694	47 58 55.55	138.07
.008	.804 0487	6038	46 04 06.91	143.11	.958	.838 1147	6689	48 01 13.57	137.96
.009	.804 7424	6033	46 06 30.00	143.00	.959	.838 7833	6684	48 03 31.48	137.86
0.010	0.805 4353	6028	46 08 52.95	142.90	0.960	0.839 4514	6679	48 05 49.29	137.76
.011	.806 1278	6023	46 11 15.79	142.80	.961	.840 1191	6674	48 08 07.00	137.66
.012	.806 8108	6018	46 13 38.51	142.69	.962	.840 7852	6669	48 10 24.60	137.55
.013	.807 5111	6013	46 16 01.18	142.59	.963	.841 4528	6664	48 12 42.10	137.45
.014	.808 2021	6008	46 18 23.72	142.49	.964	.842 1199	6659	48 14 59.50	137.35
0.015	0.808 8840	6003	46 20 46.16	142.38	0.965	0.842 7846	6654	48 17 16.80	137.25
.016	.809 5840	6008	46 23 08.49	142.28	.966	.843 4497	6649	48 19 33.99	137.14
.017	.810 2736	6003	46 25 30.72	142.18	.967	.844 1144	6644	48 21 51.09	137.04
.018	.810 9516	6008	46 27 52.85	142.08	.968	.844 7785	6639	48 24 08.08	136.94
.019	.811 6302	6003	46 30 14.87	141.97	.969	.845 4422	6634	48 26 24.96	136.84
0.020	0.812 3084	6008	46 32 36.79	141.87	0.970	0.846 1053	6629	48 28 41.75	136.73
.021	.813 0258	6003	46 34 58.61	141.77	.971	.846 7689	6624	48 30 58.43	136.63
.022	.813 7120	6008	46 37 20.33	141.66	.972	.847 4301	6619	48 33 15.01	136.53
.023	.814 3991	6003	46 39 41.91	141.56	.973	.848 0918	6614	48 35 31.49	136.43
.024	.815 0855	6008	46 42 03.45	141.46	.974	.848 7530	6609	48 37 47.87	136.32
0.025	0.815 7710	6003	46 44 24.85	141.35	0.975	0.849 4136	6604	48 40 04.14	136.22
.026	.816 4561	6008	46 46 46.16	141.25	.976	.850 0738	6599	48 42 20.31	136.12
.027	.817 1405	6003	46 49 07.36	141.15	.977	.850 7335	6594	48 44 36.38	136.02
.028	.817 8247	6008	46 51 28.45	141.05	.978	.851 3937	6589	48 46 52.34	135.92
.029	.818 5083	6003	46 53 49.45	140.94	.979	.852 0541	6584	48 49 08.21	135.81
0.030	0.819 1913	6008	46 56 10.34	140.84	0.980	0.852 7066	6579	48 51 23.67	135.71
.031	.819 8730	6003	46 58 31.13	140.74	.981	.853 3673	6574	48 53 39.63	135.61
.032	.820 5560	6008	47 00 51.81	140.63	.982	.854 0245	6569	48 55 55.19	135.51
.033	.821 2375	6003	47 03 12.40	140.53	.983	.854 6812	6564	48 58 10.64	135.40
.034	.821 9186	6008	47 05 32.88	140.43	.984	.855 3374	6559	49 00 25.00	135.30
0.035	0.822 5992	6003	47 07 53.25	140.33	0.985	0.855 9931	6554	49 02 41.25	135.20
.036	.823 2792	6008	47 10 13.53	140.22	.986	.856 6483	6549	49 04 56.40	135.10
.037	.823 9588	6003	47 12 33.70	140.12	.987	.857 3030	6544	49 07 11.44	135.00
.038	.824 6379	6008	47 14 53.77	140.02	.988	.857 9573	6539	49 09 26.39	134.89
.039	.825 3164	6003	47 17 13.71	139.91	.989	.858 6110	6534	49 11 41.23	134.79
0.040	0.825 9945	6008	47 19 33.60	139.81	0.990	0.859 2642	6529	49 13 55.97	134.69
.041	.826 6721	6003	47 21 53.39	139.71	.991	.859 9170	6524	49 16 10.61	134.59
.042	.827 3492	6008	47 24 13.02	139.61	.992	.860 5692	6519	49 18 25.15	134.49
.043	.828 0257	6003	47 26 32.57	139.50	.993	.861 2210	6514	49 20 39.58	134.38
.044	.828 7018	6008	47 28 52.02	139.40	.994	.861 8723	6509	49 22 53.92	134.28
0.045	0.829 3774	6003	47 31 11.37	139.30	0.995	0.862 5239	6504	49 25 08.15	134.18
.046	.830 0525	6008	47 33 30.62	139.20	.996	.863 1733	6499	49 27 22.28	134.08
.047	.830 7271	6003	47 35 49.76	139.09	.997	.863 8231	6494	49 29 36.30	133.98
.048	.831 4012	6008	47 38 08.80	138.99	.998	.864 4724	6489	49 31 50.23	133.87
.049	.832 0748	6003	47 40 27.71	138.89	.999	.865 1212	6484	49 34 04.05	133.77
0.050	0.832 7479	6008	47 42 46.58	138.78	1.000	0.865 7695	6481	49 36 17.77	133.67
$u$	$2 \tan^{-1}(\coth u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\coth u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(\coth u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\coth u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

$\nu$	$\sin \alpha$	$\cos \alpha$	$\sin \alpha$	$\cos \alpha$	$\nu$	$\sin \alpha$	$\cos \alpha$	$\sin \alpha$	$\cos \alpha$
1.000	0.815 7695	0.581	49 36 17.77	1.33.07	1.050	0.846 5570	0.535	50 25 34.55	1.35.61
.001	.816 4173	0.476	49 38 31.49	1.33.57	.051	.847 1959	0.530	51 27 13.11	1.35.51
.002	.817 0646	0.471	49 40 44.91	1.33.47	.052	.847 8347	0.525	51 29 23.37	1.35.41
.003	.817 7114	0.466	49 42 58.33	1.33.37	.053	.848 4790	0.520	51 31 33.63	1.35.31
.004	.818 3578	0.461	49 45 11.04	1.33.26	.054	.849 1228	0.515	51 33 43.88	1.35.21
1.005	0.819 0045	0.456	49 47 24.86	1.33.16	1.055	0.850 7691	0.510	51 36 01.31	1.35.11
.006	.820 6514	0.451	49 49 37.97	1.33.06	.056	.851 4100	0.505	51 38 14.40	1.35.00
.007	.821 2968	0.446	49 51 50.63	1.32.56	.057	.852 0503	0.500	51 40 31.39	1.34.50
.008	.821 9431	0.441	49 54 03.86	1.32.46	.058	.852 6900	0.495	51 42 47.91	1.34.40
.009	.822 5890	0.436	49 56 16.69	1.32.36	.059	.853 3291	0.490	51 44 47.57	1.34.29
1.010	0.823 2354	0.431	49 58 29.40	1.32.26	1.060	0.854 9745	0.485	51 46 54.03	1.34.19
.011	.823 8831	0.426	50 00 42.00	1.32.16	.061	.855 6199	0.480	51 49 03.45	1.34.08
.012	.824 5305	0.421	50 02 54.50	1.32.06	.062	.856 2643	0.475	51 51 15.61	1.33.98
.013	.825 1785	0.416	50 05 06.00	1.31.56	.063	.856 9082	0.470	51 53 25.00	1.33.87
.014	.825 8261	0.411	50 07 19.20	1.31.45	.064	.857 5512	0.465	51 55 32.25	1.33.77
1.015	0.826 4745	0.407	50 09 31.40	1.31.35	1.065	0.858 1937	0.460	51 57 37.41	1.33.66
.016	.827 1232	0.402	50 11 43.49	1.31.24	.066	.858 8359	0.455	51 59 40.40	1.33.55
.017	.827 7715	0.397	50 13 55.41	1.31.14	.067	.859 4771	0.450	52 01 49.12	1.33.44
.018	.828 4191	0.392	50 16 07.38	1.31.03	.068	.860 1179	0.445	52 03 53.37	1.33.33
.019	.829 0666	0.387	50 18 19.12	1.30.93	.069	.860 7582	0.440	52 05 58.01	1.33.22
1.020	0.829 7140	0.383	50 20 30.80	1.30.82	1.070	0.861 3982	0.435	52 08 06.65	1.33.11
.021	.830 3610	0.378	50 22 42.45	1.30.71	.071	.862 0379	0.430	52 10 13.21	1.33.00
.022	.831 0074	0.373	50 24 53.94	1.30.61	.072	.862 6771	0.425	52 12 19.70	1.32.89
.023	.831 6534	0.369	50 27 05.33	1.30.50	.073	.863 3159	0.420	52 14 26.01	1.32.78
.024	.832 2989	0.364	50 29 16.61	1.30.40	.074	.863 9543	0.415	52 16 32.31	1.32.67
1.025	0.832 9440	0.359	50 31 27.29	1.30.29	1.075	0.864 5924	0.410	52 18 38.46	1.32.56
.026	.833 5891	0.354	50 33 38.32	1.30.18	.076	.865 2301	0.405	52 20 41.31	1.32.45
.027	.834 2334	0.349	50 35 49.35	1.30.08	.077	.865 8675	0.400	52 22 47.45	1.32.34
.028	.834 8771	0.344	50 38 00.23	1.29.97	.078	.866 5046	0.395	52 24 53.31	1.32.23
.029	.835 5200	0.339	50 40 11.51	1.29.87	.079	.867 1413	0.390	52 27 00.00	1.32.12
1.030	0.836 1625	0.334	50 42 22.19	1.29.76	1.080	0.867 7777	0.385	52 29 06.25	1.32.01
.031	.836 8046	0.329	50 44 32.70	1.29.65	.081	.868 4139	0.380	52 31 13.30	1.31.90
.032	.837 4463	0.324	50 46 43.24	1.29.55	.082	.869 0497	0.375	52 33 20.70	1.31.79
.033	.838 0872	0.319	50 48 53.61	1.29.44	.083	.869 6851	0.370	52 35 28.41	1.31.68
.034	.838 7273	0.314	50 51 03.89	1.29.33	.084	.870 3201	0.365	52 37 36.01	1.31.57
1.035	0.839 3671	0.309	50 53 14.06	1.29.22	1.085	0.870 9547	0.360	52 39 43.31	1.31.46
.036	.840 0065	0.304	50 55 24.13	1.29.12	.086	.871 5889	0.355	52 41 50.60	1.31.35
.037	.840 6456	0.299	50 57 34.10	1.29.01	.087	.872 2227	0.350	52 43 57.50	1.31.24
.038	.841 2843	0.294	50 59 43.97	1.28.90	.088	.872 8561	0.345	52 46 04.41	1.31.13
.039	.841 9226	0.289	51 01 53.74	1.28.80	.089	.873 4891	0.340	52 48 11.31	1.31.02
1.040	0.842 5605	0.284	51 04 03.41	1.28.69	1.090	0.874 1217	0.335	52 50 18.31	1.30.91
.041	.843 1980	0.279	51 06 13.03	1.28.58	.091	.874 7539	0.330	52 52 25.31	1.30.80
.042	.843 8351	0.274	51 08 22.44	1.28.48	.092	.875 3857	0.325	52 54 32.32	1.30.69
.043	.844 4716	0.269	51 10 31.81	1.28.37	.093	.876 0171	0.320	52 56 39.31	1.30.58
.044	.845 1077	0.264	51 12 41.07	1.28.27	.094	.876 6481	0.315	52 58 46.30	1.30.47
1.045	0.845 7434	0.259	51 14 50.24	1.28.16	1.095	0.877 2787	0.310	53 00 53.27	1.30.36
.046	.846 3786	0.254	51 16 59.30	1.28.05	.096	.877 9089	0.305	53 03 00.24	1.30.25
.047	.847 0133	0.249	51 19 08.38	1.27.95	.097	.878 5387	0.300	53 05 07.20	1.30.14
.048	.847 6476	0.244	51 21 17.43	1.27.84	.098	.879 1681	0.295	53 07 14.12	1.30.03
.049	.848 2815	0.239	51 23 26.38	1.27.74	.099	.879 7971	0.290	53 09 21.01	1.29.92
1.050	0.848 9150	0.234	51 25 35.55	1.27.63	1.100	0.880 4257	0.285	53 11 27.91	1.29.81
$\pi$	$2 \sin^{-1}(\sin \frac{\pi}{2})$	$\frac{\pi}{2}$	$2 \tan^{-1}(\tan \frac{\pi}{2})$	$\frac{\pi}{2}$	$\pi$	$2 \sin^{-1}(\sin \frac{\pi}{2})$	$\frac{\pi}{2}$	$2 \tan^{-1}(\tan \frac{\pi}{2})$	$\frac{\pi}{2}$

SMITHSONIAN TABLE

The Gudermannian.

u	gd u	$\omega F_0'$	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	gd u	$\omega F_0'$
1.100	0.928 1274	5993	53 10 40.01	123.62	1.150	0.957 4980	5756	54 51 38.15	118.72
.101	.928 7205	5989	53 12 43.59	123.52	.151	.958 0734	5751	54 53 36.82	118.62
.102	.929 3251	5984	53 14 47.06	123.42	.152	.958 6482	5746	54 55 35.39	118.53
.103	.929 9232	5979	53 16 50.43	123.32	.153	.959 2226	5742	54 57 33.87	118.43
.104	.930 5209	5974	53 18 53.71	123.23	.154	.959 7965	5737	54 59 32.25	118.33
1.105	0.931 1181	5969	53 20 56.89	123.13	1.155	0.960 3700	5732	55 01 30.53	118.23
.106	.931 7148	5965	53 22 59.96	123.03	.156	.960 9430	5727	55 03 28.72	118.14
.107	.932 3110	5960	53 25 02.94	122.93	.157	.961 5155	5723	55 05 26.81	118.04
.108	.932 9067	5955	53 27 05.82	122.83	.158	.962 0875	5718	55 07 24.80	117.94
.109	.933 5020	5950	53 29 08.60	122.73	.159	.962 6591	5713	55 09 22.69	117.85
1.110	0.934 0968	5945	53 31 11.29	122.63	1.160	0.963 2302	5709	55 11 20.49	117.75
.111	.934 6911	5941	53 33 13.87	122.54	.161	.963 8008	5704	55 13 18.19	117.65
.112	.935 2849	5936	53 35 16.36	122.44	.162	.964 3710	5699	55 15 15.80	117.56
.113	.935 8782	5931	53 37 18.75	122.34	.163	.964 9407	5695	55 17 13.31	117.46
.114	.936 4711	5926	53 39 21.03	122.24	.164	.965 5099	5690	55 19 10.72	117.36
1.115	0.937 0635	5922	53 41 23.22	122.14	1.165	0.966 0787	5685	55 21 08.04	117.27
.116	.937 6554	5917	53 43 25.32	122.04	.166	.966 6470	5681	55 23 05.26	117.17
.117	.938 2469	5912	53 45 27.31	121.94	.167	.967 2148	5676	55 25 02.38	117.07
.118	.938 8378	5907	53 47 29.21	121.85	.168	.967 7822	5672	55 26 59.41	116.98
.119	.939 4283	5902	53 49 31.00	121.75	.169	.968 3491	5667	55 28 56.34	116.88
1.120	0.940 0183	5898	53 51 32.70	121.65	1.170	0.968 9155	5662	55 30 53.17	116.79
.121	.940 6079	5893	53 53 34.30	121.55	.171	.969 4815	5657	55 32 49.91	116.69
.122	.941 1969	5888	53 55 35.80	121.45	.172	.970 0470	5653	55 34 46.55	116.59
.123	.941 7855	5883	53 57 37.21	121.35	.173	.970 6120	5648	55 36 43.10	116.50
.124	.942 3736	5879	53 59 38.51	121.26	.174	.971 1766	5643	55 38 39.54	116.40
1.125	0.942 9613	5874	54 01 39.72	121.16	1.175	0.971 7407	5639	55 40 35.60	116.31
.126	.943 5484	5869	54 03 40.83	121.06	.176	.972 3043	5634	55 42 32.16	116.21
.127	.944 1351	5864	54 05 41.84	120.96	.177	.972 8675	5629	55 44 28.32	116.11
.128	.944 7213	5860	54 07 42.76	120.86	.178	.973 4301	5625	55 46 24.38	116.02
.129	.945 3070	5855	54 09 43.57	120.77	.179	.973 9921	5620	55 48 20.35	115.92
1.130	0.945 8923	5850	54 11 44.29	120.67	1.180	0.974 5542	5615	55 50 16.22	115.83
.131	.946 4771	5845	54 13 44.91	120.57	.181	.975 1155	5611	55 52 12.00	115.73
.132	.947 0614	5841	54 15 45.43	120.47	.182	.975 6763	5606	55 54 07.68	115.63
.133	.947 6452	5836	54 17 45.85	120.38	.183	.976 2377	5601	55 56 03.27	115.54
.134	.948 2286	5831	54 19 46.18	120.28	.184	.976 7966	5597	55 57 58.76	115.44
1.135	0.948 8115	5826	54 21 46.41	120.18	1.185	0.977 3560	5592	55 59 54.15	115.35
.136	.949 3939	5822	54 23 46.54	120.08	.186	.977 9150	5588	56 01 49.45	115.25
.137	.949 9758	5817	54 25 46.53	119.98	.187	.978 4735	5583	56 03 44.66	115.16
.138	.950 5573	5812	54 27 46.51	119.89	.188	.979 0316	5578	56 05 39.76	115.06
.139	.951 1383	5807	54 29 46.35	119.79	.189	.979 5892	5574	56 07 34.78	114.96
1.140	0.951 7188	5803	54 31 46.09	119.69	1.190	0.980 1463	5569	56 09 29.69	114.87
.141	.952 2984	5798	54 33 45.74	119.59	.191	.980 7030	5564	56 11 24.51	114.77
.142	.952 8781	5793	54 35 45.28	119.50	.192	.981 2592	5560	56 13 19.24	114.68
.143	.953 4575	5789	54 37 44.73	119.40	.193	.981 8149	5555	56 15 13.87	114.58
.144	.954 0361	5784	54 39 44.08	119.30	.194	.982 3702	5551	56 17 08.41	114.49
1.145	0.954 6143	5779	54 41 43.34	119.21	1.195	0.982 9251	5546	56 19 02.85	114.39
.146	.955 1920	5775	54 43 42.49	119.11	.196	.983 4794	5541	56 20 57.19	114.30
.147	.955 7692	5770	54 45 41.55	119.01	.197	.984 0333	5537	56 22 51.44	114.20
.148	.956 3460	5765	54 47 40.51	118.91	.198	.984 5878	5532	56 24 45.60	114.11
.149	.956 9222	5760	54 49 39.38	118.82	.199	.985 1397	5527	56 26 39.66	114.01
1.150	0.957 4980	5756	54 51 38.15	118.72	1.200	0.985 6922	5523	56 28 33.62	113.92
u	$2 \tan^{-1}(eu) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(eu) - 90^\circ$	$\omega \operatorname{sech} u$	u	$2 \tan^{-1}(eu) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(eu) - 90^\circ$	$\omega \operatorname{sech} u$



The Gndermannian.

$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$	$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$
1.200	0.985 6022	5543	56 38 33.62	113.02	1.250	1.012 7356	5295	58 01 31.72	100.73
1.201	0.986 2413	5508	56 39 27.49	113.82	1.251	1.013 2949	5261	58 03 26.59	100.73
1.202	0.986 7950	5474	56 40 21.36	114.63	1.252	1.014 2931	5227	58 05 22.08	100.73
1.203	0.987 3470	5440	56 41 15.04	115.04	1.253	1.014 1222	5193	58 06 38.43	100.73
1.204	0.987 8977	5404	56 42 08.53	115.54	1.254	1.014 8502	5159	58 08 17.28	100.73
1.205	0.988 4479	5369	56 43 02.02	116.04	1.255	1.015 3777	5125	58 10 36.69	100.73
1.206	0.988 9977	5335	56 43 55.42	116.35	1.256	1.015 9048	5090	58 12 35.40	100.73
1.207	0.989 5470	5301	56 44 48.72	116.65	1.257	1.016 4304	5056	58 14 14.03	100.73
1.208	0.990 0958	5266	56 45 41.02	116.96	1.258	1.016 9576	5021	58 16 02.50	100.73
1.209	0.990 6442	5232	56 46 33.03	117.06	1.259	1.017 4843	5085	58 17 51.00	100.73
1.210	0.991 1921	5197	56 47 28.05	117.07	1.260	1.018 0086	5051	58 19 39.45	100.73
1.211	0.991 7396	5162	56 48 20.07	117.33	1.261	1.018 5335	5017	58 21 37.04	100.73
1.212	0.992 2866	5128	56 49 13.85	117.78	1.262	1.019 0578	5083	58 23 15.27	100.73
1.213	0.992 8331	5093	56 50 05.51	117.69	1.263	1.019 5818	5048	58 25 03.41	100.73
1.214	0.993 3792	5059	56 51 00.17	117.50	1.264	1.020 1053	5013	58 26 51.34	100.73
1.215	0.993 9249	5024	56 52 31.72	117.50	1.265	1.020 6283	5078	58 28 39.24	100.73
1.216	0.994 4700	5089	56 53 41.12	117.40	1.266	1.021 1500	5043	58 30 27.50	100.73
1.217	0.995 0148	5054	56 54 46.53	117.31	1.267	1.021 6714	5008	58 32 14.91	100.73
1.218	0.995 5590	5019	56 55 48.79	117.22	1.268	1.022 1928	5073	58 34 02.35	100.73
1.219	0.996 1028	5084	56 56 40.96	117.12	1.269	1.022 7101	5038	58 35 50.44	100.73
1.220	0.996 6462	5049	56 57 05.13	117.04	1.270	1.023 2299	5003	58 37 37.77	100.73
1.221	0.997 1891	5014	56 58 05.01	117.03	1.271	1.023 7523	5068	58 39 25.40	100.73
1.222	0.997 7315	5079	56 59 05.90	117.84	1.272	1.024 2772	5033	58 41 12.45	100.73
1.223	0.998 2735	5044	56 60 06.60	117.74	1.273	1.024 7997	5098	58 43 00.50	100.73
1.224	0.998 8150	5009	56 61 07.30	117.65	1.274	1.025 3218	5063	58 44 48.50	100.73
1.225	0.999 3569	5074	56 62 08.00	117.56	1.275	1.025 8441	5028	58 46 36.54	100.73
1.226	0.999 8987	5039	56 63 08.50	117.47	1.276	1.026 3655	5093	58 48 24.44	100.73
1.227	1.000 4399	5004	56 64 09.02	117.37	1.277	1.026 8870	5058	58 50 12.30	100.73
1.228	1.000 9806	5069	56 65 09.34	117.28	1.278	1.027 4076	5023	58 52 00.50	100.73
1.229	1.001 5215	5034	56 66 09.47	117.18	1.279	1.027 9274	5088	58 53 48.50	100.73
1.230	1.002 0616	5099	56 67 09.60	117.09	1.280	1.028 4473	5053	58 55 36.02	100.73
1.231	1.002 6019	5064	56 68 09.64	117.00	1.281	1.028 9672	5018	58 57 23.44	100.73
1.232	1.003 1423	5029	56 69 09.59	116.90	1.282	1.029 4871	5083	58 59 11.27	100.73
1.233	1.003 6828	5094	56 70 09.45	116.81	1.283	1.030 0070	5048	59 01 00.00	100.73
1.234	1.004 2233	5059	56 71 09.21	116.71	1.284	1.030 5269	5013	59 02 48.40	100.73
1.235	1.004 7638	5024	56 72 08.88	116.62	1.285	1.031 0468	5078	59 04 36.54	100.73
1.236	1.005 3043	5089	56 73 08.45	116.53	1.286	1.031 5667	5043	59 06 24.44	100.73
1.237	1.005 8448	5054	56 74 07.93	116.43	1.287	1.032 0866	5008	59 08 12.30	100.73
1.238	1.006 3853	5019	56 75 07.32	116.34	1.288	1.032 6065	5073	59 10 00.50	100.73
1.239	1.006 9258	5084	56 76 06.61	116.25	1.289	1.033 1264	5038	59 11 48.50	100.73
1.240	1.007 4663	5049	56 77 05.81	116.15	1.290	1.033 6463	5003	59 13 36.54	100.73
1.241	1.008 0068	5014	56 78 04.92	116.06	1.291	1.034 1662	5068	59 15 24.44	100.73
1.242	1.008 5473	5079	56 79 04.04	115.97	1.292	1.034 6861	5033	59 17 12.30	100.73
1.243	1.009 0878	5044	56 80 03.15	115.88	1.293	1.035 2060	5098	59 19 00.50	100.73
1.244	1.009 6283	5009	56 81 02.16	115.78	1.294	1.035 7259	5063	59 20 48.50	100.73
1.245	1.010 1688	5074	56 82 01.13	115.69	1.295	1.036 2458	5028	59 22 36.54	100.73
1.246	1.010 7093	5039	56 83 00.02	115.60	1.296	1.036 7657	5093	59 24 24.44	100.73
1.247	1.011 2498	5004	56 84 00.62	115.50	1.297	1.037 2856	5058	59 26 12.30	100.73
1.248	1.011 7903	5069	56 85 01.08	115.41	1.298	1.037 8055	5023	59 28 00.50	100.73
1.249	1.012 3308	5034	56 86 01.54	115.32	1.299	1.038 3254	5088	59 29 48.50	100.73
1.250	1.012 8713	5099	56 87 02.72	115.23	1.300	1.038 8453	5053	59 31 36.54	100.73
$u$	$2 \tan^{-1}(\cot u) - \frac{\pi}{2}$	$\cot u$	$2 \tan^{-1}(\cot u) - 90^\circ$	$\cot u$	$u$	$2 \tan^{-1}(\cot u) - \frac{\pi}{2}$	$\cot u$	$2 \tan^{-1}(\cot u) - 90^\circ$	$\cot u$

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$	$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$
1.300	1.083 0561	5024	59 30 38.21	104.05	1.350	1.063 4837	4858	60 55 59.27	100.21
.301	.030 1633	5024	59 32 22.82	104.56	.351	.063 9694	4854	60 57 39.43	100.12
.302	.030 6700	5065	59 34 07.34	104.47	.352	.064 4546	4850	60 59 19.51	100.03
.303	.030 1763	5061	59 35 51.77	104.38	.353	.064 9393	4846	61 00 59.50	99.95
.304	.030 6822	5056	59 37 36.10	104.29	.354	.065 4237	4841	61 02 39.41	99.86
1.305	1.044 1876	5052	59 39 20.35	104.20	1.355	1.065 9076	4837	61 04 19.22	99.77
.306	.044 6936	5048	59 41 04.51	104.11	.356	.066 3911	4833	61 05 58.95	99.69
.307	.044 1971	5043	59 42 48.58	104.02	.357	.066 8742	4829	61 07 38.59	99.60
.308	.044 7012	5040	59 44 32.56	103.93	.358	.067 3568	4824	61 09 18.15	99.51
.309	.044 2049	5035	59 46 16.45	103.84	.359	.067 8390	4820	61 10 57.61	99.42
1.310	1.043 7081	5030	59 48 00.25	103.75	1.360	1.068 3209	4816	61 12 36.99	99.34
.311	.044 2169	5026	59 49 43.66	103.67	.361	.068 8022	4812	61 14 16.29	99.25
.312	.044 7133	5021	59 51 27.58	103.58	.362	.069 2832	4808	61 15 55.49	99.16
.313	.045 2153	5017	59 53 11.44	103.49	.363	.069 7637	4803	61 17 34.61	99.08
.314	.045 7167	5013	59 54 54.55	103.40	.364	.070 2439	4799	61 19 13.64	98.99
1.315	1.046 2128	5008	59 56 37.91	103.31	1.365	1.070 7236	4795	61 20 52.59	98.90
.316	.046 7184	5004	59 58 21.17	103.22	.366	.071 2028	4791	61 22 31.45	98.82
.317	.047 2183	5000	60 00 04.34	103.13	.367	.071 6817	4786	61 24 10.22	98.73
.318	.047 7184	4995	60 01 47.43	103.04	.368	.072 1601	4782	61 25 48.90	98.64
.319	.048 2177	4991	60 03 30.42	102.95	.369	.072 6382	4778	61 27 27.50	98.55
1.320	1.048 7166	4987	60 05 13.33	102.86	1.370	1.073 1153	4774	61 29 06.01	98.47
.321	.049 2151	4983	60 06 56.14	102.77	.371	.073 5929	4770	61 30 44.44	98.38
.322	.049 7131	4978	60 08 38.87	102.68	.372	.074 0707	4766	61 32 22.78	98.30
.323	.050 2107	4974	60 10 21.51	102.59	.373	.074 5480	4761	61 34 01.03	98.21
.324	.050 7079	4970	60 12 04.06	102.50	.374	.075 0220	4757	61 35 39.20	98.12
1.325	1.051 2046	4965	60 13 46.52	102.42	1.375	1.075 4975	4753	61 37 17.28	98.04
.326	.051 7000	4961	60 15 28.89	102.33	.376	.075 9725	4749	61 38 55.27	97.95
.327	.052 1983	4957	60 17 11.17	102.24	.377	.076 4472	4745	61 40 33.18	97.86
.328	.052 6943	4952	60 18 53.37	102.15	.378	.076 9215	4740	61 42 11.00	97.78
.329	.053 1874	4948	60 20 35.47	102.06	.379	.077 3953	4736	61 43 48.73	97.69
1.330	1.053 6819	4944	60 22 17.49	101.97	1.380	1.077 8687	4732	61 45 26.38	97.61
.331	.054 1760	4939	60 23 59.41	101.88	.381	.078 3417	4728	61 47 03.94	97.52
.332	.054 6668	4935	60 25 41.25	101.79	.382	.078 8143	4724	61 48 41.42	97.43
.333	.055 1631	4931	60 27 23.00	101.71	.383	.079 2865	4720	61 50 18.81	97.35
.334	.055 6559	4927	60 29 04.67	101.62	.384	.079 7582	4715	61 51 56.12	97.26
1.335	1.056 1484	4922	60 30 46.24	101.53	1.385	1.080 2295	4711	61 53 33.34	97.18
.336	.056 6401	4918	60 32 27.72	101.44	.386	.080 7005	4707	61 55 10.47	97.09
.337	.057 1320	4914	60 34 09.12	101.35	.387	.081 1710	4703	61 56 47.52	97.01
.338	.057 6231	4909	60 35 50.43	101.26	.388	.081 6411	4699	61 58 24.48	96.92
.339	.058 1139	4905	60 37 31.65	101.18	.389	.082 1107	4695	62 00 01.36	96.83
1.340	1.058 6043	4901	60 39 12.78	101.09	1.390	1.082 5800	4691	62 01 38.15	96.75
.341	.059 0940	4897	60 40 53.83	101.00	.391	.083 0488	4686	62 03 14.86	96.66
.342	.059 5835	4892	60 42 34.78	100.91	.392	.083 5173	4682	62 04 51.48	96.58
.343	.060 0725	4888	60 44 15.65	100.82	.393	.083 9853	4678	62 06 28.01	96.49
.344	.060 5611	4884	60 45 56.43	100.74	.394	.084 4529	4674	62 08 04.46	96.41
1.345	1.061 0493	4880	60 47 37.12	100.65	1.395	1.084 9201	4670	62 09 40.83	96.32
.346	.061 5370	4875	60 49 17.73	100.56	.396	.085 3868	4666	62 11 17.11	96.24
.347	.062 0243	4871	60 50 58.24	100.47	.397	.085 8532	4662	62 12 53.30	96.15
.348	.062 5112	4867	60 52 38.67	100.38	.398	.086 3192	4657	62 14 29.41	96.07
.349	.062 9977	4863	60 54 19.01	100.30	.399	.086 7847	4653	62 16 05.44	95.98
1.350	1.063 4837	4858	60 55 59.27	100.21	1.400	1.087 2498	4649	62 17 41.37	95.90
$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermann.

$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$	$u$	$\sin u$	$\cos u$	$\tan u$	$\cot u$
1.400	1.087 2498	.4649	62 17 41.37	95.99	1.450	1.100 9850	.4147	63 35 51.71	91.72
.401	.087 2145	.4645	62 19 17.24	95.81	.451	.100 9301	.4143	63 37 27.02	91.61
.402	.088 1788	.4641	62 20 53.00	95.73	.452	.100 8755	.4139	63 39 02.33	91.50
.403	.088 6427	.4637	62 22 28.68	95.61	.453	.100 8209	.4135	63 40 37.64	91.42
.404	.089 1052	.4633	62 24 04.28	95.50	.454	.100 7664	.4131	63 42 12.95	91.30
1.405	1.089 5603	.4629	62 25 39.80	95.47	1.455	1.100 7120	.4127	63 43 38.25	91.21
.406	.090 0120	.4625	62 27 15.33	95.39	.456	.100 6575	.4123	63 45 13.56	91.13
.407	.090 4642	.4620	62 28 50.68	95.30	.457	.100 6030	.4119	63 46 38.87	91.05
.408	.090 9501	.4616	62 30 25.84	95.22	.458	.100 5485	.4115	63 48 14.18	90.97
.409	.091 4175	.4612	62 32 01.02	95.14	.459	.100 4940	.4111	63 49 39.49	90.88
1.410	1.091 8785	.4608	62 33 36.11	95.05	1.460	1.100 4395	.4107	63 51 14.80	90.80
.411	.092 3391	.4604	62 35 11.12	94.97	.461	.100 3850	.4103	63 52 40.11	90.72
.412	.092 7993	.4600	62 36 46.01	94.88	.462	.100 3305	.4099	63 54 05.42	90.64
.413	.093 2501	.4596	62 38 20.88	94.80	.463	.100 2760	.4095	63 55 30.73	90.56
.414	.093 7185	.4592	62 40 05.61	94.71	.464	.100 2215	.4091	63 56 56.04	90.48
1.415	1.094 1775	.4588	62 41 30.31	94.63	1.465	1.100 1670	.4087	63 58 21.35	90.40
.416	.094 6391	.4584	62 43 04.90	94.55	.466	.100 1125	.4083	63 59 46.66	90.31
.417	.095 0942	.4580	62 44 39.40	94.46	.467	.100 0580	.4079	64 01 21.97	90.23
.418	.095 5500	.4576	62 46 13.81	94.38	.468	.100 0035	.4075	64 02 47.28	90.15
.419	.096 0094	.4572	62 47 48.16	94.29	.469	.100 3000	.4071	64 04 22.59	90.07
1.420	1.096 4683	.4568	62 49 22.41	94.21	1.470	1.100 2455	.4067	64 05 47.90	89.99
.421	.096 9288	.4564	62 50 56.59	94.13	.471	.100 1910	.4063	64 07 23.21	89.91
.422	.097 3790	.4560	62 52 30.60	94.04	.472	.100 1365	.4059	64 08 48.52	89.83
.423	.097 8317	.4556	62 54 04.66	93.96	.473	.100 0820	.4055	64 10 23.83	89.75
.424	.098 2860	.4552	62 55 38.68	93.88	.474	.100 0275	.4051	64 11 49.14	89.67
1.425	1.098 7419	.4548	62 57 12.41	93.79	1.475	1.100 0730	.4047	64 13 24.45	89.59
.426	.099 1994	.4544	62 58 46.10	93.71	.476	.100 0185	.4043	64 14 49.76	89.51
.427	.099 6530	.4540	62 60 19.84	93.62	.477	.100 1400	.4039	64 16 25.07	89.43
.428	.100 1073	.4536	62 61 53.41	93.54	.478	.100 2815	.4035	64 18 00.38	89.35
.429	.100 5606	.4532	62 63 26.91	93.46	.479	.100 3270	.4031	64 19 25.69	89.27
1.430	1.101 0134	.4528	62 65 00.34	93.37	1.480	1.100 4725	.4027	64 21 01.00	89.19
.431	.101 4659	.4524	62 66 33.60	93.29	.481	.100 4180	.4023	64 22 26.31	89.11
.432	.101 9189	.4520	62 68 06.91	93.21	.482	.100 3635	.4019	64 24 01.62	89.03
.433	.102 3697	.4516	62 69 40.08	93.13	.483	.100 3090	.4015	64 25 26.93	88.95
.434	.102 8210	.4512	62 71 13.10	93.04	.484	.100 2545	.4011	64 27 02.24	88.87
1.435	1.103 2719	.4508	62 72 46.16	92.96	1.485	1.100 2000	.4007	64 28 27.55	88.79
.436	.103 7234	.4504	62 74 19.08	92.88	.486	.100 1455	.4003	64 30 02.86	88.71
.437	.104 1724	.4499	62 75 51.91	92.79	.487	.100 0910	.4000	64 31 28.17	88.63
.438	.104 6221	.4495	62 77 24.66	92.71	.488	.100 0365	.3996	64 33 03.48	88.55
.439	.105 0714	.4491	62 78 57.33	92.63	.489	.100 0820	.3992	64 34 28.79	88.47
1.440	1.105 5202	.4487	62 80 29.92	92.55	1.490	1.100 1275	.3988	64 36 04.10	88.39
.441	.105 9687	.4483	62 82 02.42	92.47	.491	.100 0730	.3984	64 37 29.41	88.31
.442	.106 4168	.4479	62 83 34.84	92.38	.492	.100 0185	.3980	64 39 04.72	88.23
.443	.106 8641	.4475	62 85 07.18	92.30	.493	.100 2130	.3976	64 40 30.03	88.15
.444	.107 3112	.4471	62 86 39.41	92.21	.494	.100 2585	.3972	64 42 05.34	88.07
1.445	1.107 7581	.4467	62 88 11.61	92.13	1.495	1.100 3040	.3968	64 43 30.65	87.99
.446	.108 2050	.4463	62 89 43.70	92.05	.496	.100 2495	.3964	64 45 05.96	87.91
.447	.108 6511	.4459	62 91 15.71	91.97	.497	.100 1950	.3960	64 46 31.27	87.83
.448	.109 0968	.4455	62 92 47.63	91.88	.498	.100 1405	.3956	64 48 06.58	87.75
.449	.109 5421	.4451	62 94 19.48	91.80	.499	.100 0860	.3952	64 49 31.89	87.67
1.450	1.109 9869	.4447	62 95 51.24	91.72	1.500	1.100 2315	.3948	64 51 07.20	87.59
$u$	$2 \tan^{-1}(\sin u)$	$\cos u$	$2 \tan^{-1}(\sin u)$	$\cot u$	$u$	$2 \tan^{-1}(\sin u)$	$\cos u$	$2 \tan^{-1}(\sin u)$	$\cot u$

The Gudermannian.

$u$	$gd\ u$	$\omega F_u$	$gd\ u$	$\omega F_u$	$u$	$gd\ u$	$\omega F_u$	$gd\ u$	$\omega F_u$
1.500	1.131 7.833	4251	61 50 35.73	87.68	1.550	1.152 5078	4062	66 02 01.81	83.78
.501	1.132 15.32	4247	61 52 03.37	87.60	.551	1.152 9139	4058	66 03 25.55	83.71
.502	1.132 5778	4243	61 53 30.93	87.52	.552	1.153 3105	4055	66 04 49.22	83.63
.503	1.133 0010	4239	61 54 58.42	87.44	.553	1.153 7248	4051	66 06 12.81	83.55
.504	1.133 4257	4236	61 56 25.82	87.37	.554	1.154 1297	4047	66 07 36.33	83.48
1.505	1.133 8490	4232	61 57 53.15	87.29	1.555	1.154 5342	4043	66 08 59.77	83.40
.506	1.134 2730	4228	61 59 20.40	87.21	.556	1.154 9381	4040	66 10 23.14	83.33
.507	1.134 6940	4224	65 00 47.56	87.13	.557	1.155 3421	4036	66 11 46.42	83.25
.508	1.135 1168	4220	65 02 14.65	87.05	.558	1.155 7456	4032	66 13 09.63	83.17
.509	1.135 5387	4216	65 03 41.66	86.97	.559	1.156 1486	4029	66 14 32.77	83.10
1.510	1.135 9501	4213	65 05 08.59	86.89	1.560	1.156 5513	4025	66 15 55.83	83.02
.511	1.136 3812	4209	65 06 35.41	86.81	.561	1.156 9530	4021	66 17 18.81	82.95
.512	1.136 8010	4205	65 08 02.22	86.73	.562	1.157 3556	4018	66 18 41.72	82.87
.513	1.137 2222	4201	65 09 28.91	86.65	.563	1.157 7571	4014	66 20 04.55	82.79
.514	1.137 6421	4197	65 10 55.53	86.58	.564	1.158 1583	4010	66 21 27.31	82.72
1.515	1.138 0617	4194	65 12 22.07	86.50	1.565	1.158 5592	4007	66 22 49.99	82.64
.516	1.138 4803	4190	65 13 48.52	86.42	.566	1.158 9597	4003	66 24 12.59	82.57
.517	1.138 8926	4186	65 15 14.91	86.34	.567	1.159 3598	3999	66 25 35.12	82.49
.518	1.139 3080	4183	65 16 41.21	86.26	.568	1.159 7595	3995	66 26 57.57	82.42
.519	1.139 7260	4178	65 18 07.43	86.18	.569	1.160 1589	3992	66 28 19.95	82.34
1.520	1.140 1537	4175	65 19 33.58	86.11	1.570	1.160 5579	3988	66 29 42.25	82.26
.521	1.140 5709	4171	65 20 59.61	86.03	.571	1.160 9566	3985	66 31 04.48	82.19
.522	1.140 9878	4167	65 22 25.63	85.95	.572	1.161 3548	3981	66 32 26.63	82.11
.523	1.141 4043	4163	65 23 51.54	85.87	.573	1.161 7527	3977	66 33 48.71	82.04
.524	1.141 8205	4159	65 25 17.38	85.79	.574	1.162 1503	3974	66 35 10.71	81.96
1.525	1.142 2362	4156	65 26 43.13	85.72	1.575	1.162 5475	3970	66 36 32.63	81.89
.526	1.142 6516	4152	65 28 08.81	85.64	.576	1.162 9443	3966	66 37 54.48	81.81
.527	1.143 0666	4148	65 29 34.11	85.56	.577	1.163 3408	3963	66 39 16.26	81.74
.528	1.143 4812	4144	65 30 59.93	85.48	.578	1.163 7369	3959	66 40 37.96	81.66
.529	1.143 8954	4141	65 32 25.37	85.40	.579	1.164 1326	3955	66 41 59.58	81.59
1.530	1.144 3093	4137	65 33 50.74	85.33	1.580	1.164 5279	3952	66 43 21.13	81.51
.531	1.144 7228	4133	65 35 16.02	85.25	.581	1.164 9230	3948	66 44 42.61	81.44
.532	1.145 1359	4129	65 36 41.23	85.17	.582	1.165 3176	3945	66 46 04.01	81.36
.533	1.145 5486	4125	65 38 06.37	85.09	.583	1.165 7119	3941	66 47 25.33	81.29
.534	1.145 9610	4122	65 39 31.42	85.02	.584	1.166 1058	3937	66 48 46.58	81.21
1.535	1.146 3730	4118	65 40 56.40	84.94	1.585	1.166 4993	3934	66 50 07.76	81.14
.536	1.146 7846	4114	65 42 21.30	84.86	.586	1.166 8925	3930	66 51 28.86	81.06
.537	1.147 1958	4110	65 43 46.12	84.78	.587	1.167 2854	3926	66 52 49.89	80.99
.538	1.147 6067	4107	65 45 10.87	84.71	.588	1.167 6778	3923	66 54 10.81	80.92
.539	1.148 0172	4103	65 46 35.51	84.63	.589	1.168 0699	3919	66 55 31.72	80.84
1.540	1.148 4273	4099	65 48 00.13	84.55	1.590	1.168 4617	3916	66 56 52.52	80.77
.541	1.148 8370	4095	65 49 24.64	84.48	.591	1.168 8531	3912	66 58 13.25	80.69
.542	1.149 2461	4092	65 50 49.08	84.40	.592	1.169 2441	3908	66 59 33.91	80.62
.543	1.149 6551	4088	65 52 13.44	84.32	.593	1.169 6348	3905	67 00 54.49	80.54
.544	1.150 0640	4084	65 53 37.72	84.25	.594	1.170 0251	3901	67 02 15.00	80.47
1.545	1.150 4722	4081	65 55 01.93	84.17	1.595	1.170 4150	3898	67 03 35.43	80.40
.546	1.150 8801	4077	65 56 26.06	84.09	.596	1.170 8046	3894	67 04 55.79	80.32
.547	1.151 2876	4073	65 57 50.11	84.01	.597	1.171 1938	3891	67 06 16.07	80.25
.548	1.151 6947	4069	65 59 14.08	83.94	.598	1.171 5827	3887	67 07 36.28	80.17
.549	1.152 1015	4066	66 00 37.98	83.86	.599	1.171 9712	3883	67 08 56.42	80.10
1.550	1.152 5078	4062	66 02 01.81	83.78	1.600	1.172 3594	3880	67 10 16.48	80.03
$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

$u$	$\sinh u$	$\cosh u$	$\tanh u$	$u$	$\sinh u$	$\cosh u$	$\tanh u$		
1.600	1.172 3504	3880	67 10 16.48	80.03	1.650	1.191 3170	3704	68 15 26.76	76.41
.601	.172 7172	3876	67 11 36.47	79.95	.651	.191 6872	3701	68 16 43.13	76.34
.602	.173 1446	3873	67 12 56.39	79.88	.652	.191 6571	3697	68 17 59.11	76.27
.603	.173 5117	3869	67 14 16.24	79.81	.653	.192 4272	3694	68 19 15.07	76.20
.604	.173 9684	3865	67 15 36.00	79.73	.654	.192 7980	3691	68 20 31.04	76.12
1.605	1.174 3048	3862	67 16 55.69	79.66	1.655	1.193 1648	3687	68 21 47.01	76.05
.606	.174 6838	3858	67 18 15.31	79.58	.656	.193 5334	3684	68 23 03.04	75.98
.607	.175 0605	3855	67 19 34.85	79.51	.657	.193 9016	3680	68 24 19.03	75.91
.608	.175 4518	3851	67 20 54.34	79.44	.658	.194 2695	3677	68 25 35.00	75.84
.609	.175 8467	3848	67 22 13.71	79.36	.659	.194 6370	3674	68 26 51.07	75.77
1.610	1.176 2213	3844	67 23 33.07	79.29	1.660	1.195 0042	3670	68 28 07.00	75.70
.611	.176 6050	3841	67 24 52.33	79.22	.661	.195 3710	3667	68 29 22.97	75.63
.612	.176 9895	3837	67 26 11.50	79.15	.662	.195 7373	3663	68 30 38.90	75.56
.613	.177 3730	3834	67 27 30.61	79.07	.663	.196 1037	3660	68 31 54.80	75.49
.614	.177 7562	3830	67 28 49.65	79.00	.664	.196 4695	3656	68 33 10.51	75.43
1.615	1.178 1300	3826	67 30 68.61	78.93	1.665	1.196 8349	3653	68 34 26.04	75.36
.616	.178 5115	3823	67 31 27.30	78.85	.666	.197 2001	3650	68 35 41.24	75.29
.617	.178 8936	3819	67 32 46.32	78.78	.667	.197 5649	3646	68 36 56.00	75.23
.618	.179 2853	3816	67 34 05.66	78.71	.668	.197 9293	3643	68 38 10.60	75.16
.619	.179 6667	3812	67 35 24.73	78.63	.669	.198 2935	3640	68 39 25.07	75.08
1.620	1.180 0428	3809	67 36 43.43	78.56	1.670	1.198 6572	3636	68 40 40.30	75.01
.621	.180 4285	3805	67 38 02.80	78.49	.671	.199 0207	3633	68 41 55.27	74.94
.622	.180 8099	3802	67 39 21.31	78.42	.672	.199 3843	3629	68 43 10.00	74.87
.623	.181 1880	3798	67 40 39.60	78.34	.673	.199 7465	3625	68 44 24.49	74.80
.624	.181 5685	3795	67 41 58.00	78.27	.674	.200 1080	3621	68 45 38.74	74.72
1.625	1.181 9428	3791	67 43 16.34	78.20	1.675	1.200 4711	3618	68 46 52.94	74.65
.626	.182 3268	3788	67 44 34.40	78.13	.676	.200 8338	3614	68 48 06.95	74.58
.627	.182 7034	3784	67 45 52.49	78.06	.677	.201 1962	3611	68 49 20.90	74.51
.628	.183 0830	3781	67 47 10.51	77.98	.678	.201 5583	3607	68 50 34.72	74.44
.629	.183 4615	3777	67 48 28.46	77.91	.679	.201 9160	3604	68 51 48.35	74.37
1.630	1.183 8390	3774	67 49 46.33	77.84	1.680	1.202 2764	3601	68 53 01.77	74.30
.631	.184 2164	3770	67 51 04.13	77.77	.681	.202 6365	3597	68 54 15.03	74.23
.632	.184 5931	3767	67 52 21.83	77.69	.682	.202 9962	3594	68 55 28.20	74.17
.633	.184 9690	3763	67 53 39.53	77.62	.683	.203 3559	3591	68 56 41.27	74.10
.634	.185 3457	3760	67 54 57.11	77.55	.684	.203 7147	3587	68 57 54.28	74.03
1.635	1.185 7215	3756	67 56 14.62	77.48	1.685	1.204 0731	3584	68 59 07.17	73.96
.636	.186 0970	3753	67 57 32.07	77.41	.686	.204 4318	3581	69 00 20.00	73.89
.637	.186 4741	3749	67 58 49.44	77.34	.687	.204 7900	3577	69 01 32.75	73.82
.638	.186 8469	3746	68 00 06.74	77.26	.688	.205 1476	3574	69 02 45.44	73.75
.639	.187 2213	3742	68 01 24.07	77.19	.689	.205 5050	3571	69 03 58.05	73.68
1.640	1.187 5953	3739	68 02 41.42	77.12	1.690	1.205 8620	3569	69 05 10.60	73.61
.641	.187 9691	3735	68 03 58.21	77.05	.691	.206 2187	3566	69 06 23.03	73.54
.642	.188 3424	3732	68 05 15.23	76.98	.692	.206 5751	3562	69 07 35.30	73.48
.643	.188 7155	3729	68 06 32.10	76.91	.693	.206 9312	3559	69 08 47.43	73.41
.644	.189 0881	3725	68 07 48.03	76.83	.694	.207 2870	3556	69 09 59.40	73.34
1.645	1.189 4605	3723	68 09 03.83	76.76	1.695	1.207 6423	3553	69 11 11.11	73.27
.646	.189 8325	3718	68 10 20.50	76.69	.696	.207 9974	3550	69 12 22.74	73.20
.647	.190 2041	3715	68 11 37.22	76.62	.697	.208 3521	3547	69 13 34.21	73.13
.648	.190 5754	3711	68 12 53.80	76.55	.698	.208 7065	3543	69 14 45.64	73.07
.649	.190 9463	3708	68 14 10.32	76.48	.699	.209 0605	3540	69 15 56.94	73.00
1.650	1.191 3170	3704	68 15 26.76	76.41	1.700	1.209 4143	3536	69 17 08.00	72.93
$u$	$2 \tanh^{-1}(\sinh u) = \frac{\pi}{2}$	$\cosh u$	$2 \tanh^{-1}(\tanh u) = 0^\circ$	$\cosh u$	$u$	$2 \tanh^{-1}(\sinh u) = \frac{\pi}{2}$	$\cosh u$	$2 \tanh^{-1}(\tanh u) = 0^\circ$	$\cosh u$

The Gudermannian.

u	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$	u	gd u	$\omega F_0'$
1.700	1.309 4143	3536	69 17 39.60	72.93	1.750	1.226 6847	3374	70 17 01.89	69.59		
.701	.309 7677	3543	69 18 52.50	72.86	.751	.227 0310	3370	70 18 11.44	69.52		
.702	.310 1303	3550	69 20 05.33	72.79	.752	.227 3588	3367	70 19 20.93	69.45		
.703	.310 4735	3556	69 21 18.68	72.72	.753	.227 6954	3364	70 20 30.35	69.39		
.704	.310 8259	3562	69 22 30.77	72.66	.754	.228 0316	3361	70 21 39.71	69.32		
1.705	1.311 1780	3519	69 23 43.39	72.59	1.755	1.228 3676	3358	70 22 40.00	69.26		
.706	.311 5397	3516	69 24 55.95	72.52	.756	.228 7032	3355	70 23 58.23	69.19		
.707	.311 8813	3513	69 26 08.43	72.45	.757	.229 0385	3351	70 25 07.39	69.13		
.708	.312 2323	3509	69 27 20.85	72.38	.758	.229 3735	3348	70 26 16.48	69.06		
.709	.312 5840	3506	69 28 33.20	72.32	.759	.229 7082	3345	70 27 25.51	69.00		
1.710	1.312 9335	3503	69 29 45.49	72.25	1.760	1.230 0425	3342	70 28 34.48	68.93		
.711	.312 2849	3499	69 30 57.70	72.18	.761	.230 3795	3339	70 29 43.38	68.87		
.712	.312 6314	3496	69 32 09.85	72.11	.762	.230 7103	3336	70 30 52.22	68.80		
.713	.312 9838	3493	69 33 21.93	72.05	.763	.231 0437	3333	70 32 00.69	68.74		
.714	.313 3319	3490	69 34 33.94	71.98	.764	.231 3768	3330	70 33 09.69	68.67		
1.715	1.313 6807	3486	69 35 45.80	71.91	1.765	1.231 7096	3326	70 34 18.33	68.61		
.716	.313 0393	3483	69 36 57.76	71.84	.766	.232 0420	3323	70 35 26.91	68.54		
.717	.313 3771	3480	69 38 09.57	71.78	.767	.232 3742	3320	70 36 35.42	68.48		
.718	.313 7252	3477	69 39 21.32	71.71	.768	.232 7060	3317	70 37 43.87	68.42		
.719	.314 0727	3473	69 40 32.99	71.64	.769	.233 0376	3314	70 38 52.25	68.35		
1.720	1.314 4198	3470	69 41 44.60	71.58	1.770	1.233 3688	3311	70 40 00.57	68.29		
.721	.314 7667	3467	69 42 56.11	71.51	.771	.233 6997	3307	70 41 08.83	68.22		
.722	.315 1132	3464	69 44 07.62	71.44	.772	.234 0303	3304	70 42 17.02	68.16		
.723	.315 4594	3460	69 45 19.02	71.37	.773	.234 3606	3301	70 43 25.14	68.09		
.724	.315 8053	3457	69 46 30.37	71.31	.774	.234 6905	3298	70 44 33.20	68.03		
1.725	1.315 1508	3454	69 47 41.61	71.23	1.775	1.235 0202	3295	70 45 41.20	67.96		
.726	.315 4960	3451	69 48 52.85	71.16	.776	.235 3495	3292	70 46 49.13	67.90		
.727	.315 8409	3447	69 50 03.69	71.10	.777	.235 6783	3289	70 47 57.00	67.84		
.728	.316 1855	3444	69 51 15.06	71.03	.778	.236 0073	3286	70 49 04.80	67.77		
.729	.316 5297	3441	69 52 26.06	70.96	.779	.236 3357	3283	70 50 12.54	67.71		
1.730	1.316 8737	3438	69 53 37.00	70.90	1.780	1.236 6638	3279	70 51 20.22	67.64		
.731	.317 2173	3434	69 54 47.83	70.83	.781	.236 9916	3276	70 52 27.83	67.58		
.732	.317 5605	3431	69 55 58.68	70.76	.782	.237 3191	3273	70 53 35.38	67.52		
.733	.317 9035	3428	69 57 09.42	70.70	.783	.237 6463	3270	70 54 42.87	67.45		
.734	.318 2461	3425	69 58 20.10	70.63	.784	.237 9731	3267	70 55 50.29	67.39		
1.735	1.317 5885	3422	69 59 30.71	70.56	1.785	1.238 3007	3264	70 56 57.65	67.33		
.736	.318 9304	3418	70 00 41.35	70.50	.786	.238 6259	3261	70 58 04.94	67.26		
.737	.319 2721	3415	70 01 51.72	70.43	.787	.238 9519	3258	70 59 12.17	67.20		
.738	.319 6135	3412	70 03 02.13	70.37	.788	.239 2775	3255	71 00 19.34	67.13		
.739	.320 9545	3409	70 04 12.47	70.30	.789	.239 6028	3252	71 01 26.44	67.07		
1.740	1.319 2953	3405	70 05 22.75	70.23	1.790	1.239 9279	3249	71 02 33.48	67.01		
.741	.320 6356	3402	70 06 32.96	70.18	.791	.240 2526	3246	71 03 40.46	66.94		
.742	.320 9757	3399	70 07 43.10	70.11	.792	.240 5770	3243	71 04 47.37	66.88		
.743	.321 3154	3396	70 08 53.18	70.05	.793	.240 9011	3239	71 05 54.22	66.82		
.744	.321 6548	3393	70 10 03.19	69.98	.794	.241 2249	3236	71 07 01.01	66.76		
1.745	1.321 9940	3390	70 11 13.14	69.91	1.795	1.241 5483	3233	71 08 07.73	66.69		
.746	.322 3338	3386	70 12 23.02	69.85	.796	.241 8715	3230	71 09 14.39	66.63		
.747	.322 6732	3383	70 13 32.84	69.78	.797	.242 1944	3227	71 10 20.99	66.57		
.748	.323 0121	3380	70 14 42.59	69.72	.798	.242 5170	3224	71 11 27.52	66.50		
.749	.323 3512	3377	70 15 52.27	69.65	.799	.242 8392	3221	71 12 33.99	66.44		
1.750	1.226 6847	3374	70 17 01.89	69.59	1.800	1.243 1612	3218	71 13 40.40	66.38		
u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$		

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F u$	$\operatorname{gd} u$	$\omega F u$	$u$	$\operatorname{gd} u$	$\omega F u$	$\operatorname{gd} u$	$\omega F u$
1.801	1.243 1612	3248	71 13 40.40	66.33	1.850	1.255 8739	3060	72 02 41.73	63.30
.801	.243 48.38	3245	71 14 40.73	66.31	.851	.255 88.25	3055	72 03 45.05	63.24
.802	.243 80.47	3242	71 15 53.03	66.28	.852	.255 49.00	3053	72 04 48.20	63.18
.803	.244 125.2	3209	71 16 59.28	66.10	.853	.255 79.52	3050	72 10 51.41	63.12
.804	.244 44.00	3206	71 18 05.41	66.13	.854	.256 101.1	3057	72 11 54.30	63.06
1.805	1.244 766.1	3203	71 19 11.59	66.06	1.855	1.256 406.0	3054	72 12 57.53	63.00
.805	.245 08.38	3200	71 20 17.53	66.00	.855	.256 711.9	3051	72 14 00.50	62.94
.806	.245 40.31	3107	71 21 24.50	65.91	.857	.257 016.9	3048	72 15 03.40	62.88
.808	.245 72.59	3104	71 22 29.41	65.83	.858	.257 321.6	3045	72 16 06.26	62.82
.809	.246 04.51	3191	71 23 35.26	65.81	.859	.257 626.0	3043	72 17 09.05	62.76
1.810	1.246 364.0	3188	71 24 41.01	65.75	1.860	1.257 930.2	3040	72 18 11.73	62.70
.811	.246 68.47	3185	71 25 46.76	65.69	.861	.257 235.0	3037	72 19 14.45	62.64
.812	.247 00.00	3182	71 26 52.43	65.63	.862	.257 537.5	3034	72 20 17.03	62.58
.813	.247 31.90	3179	71 27 58.01	65.59	.863	.257 840.3	3031	72 21 19.61	62.52
.814	.247 63.67	3176	71 29 03.54	65.50	.864	.258 144.8	3028	72 22 22.16	62.46
1.815	1.247 954.1	3173	71 30 09.02	65.44	1.865	1.258 449.1	3025	72 23 24.54	62.40
.816	.248 27.12	3170	71 31 14.42	65.38	.866	.258 753.8	3022	72 24 26.91	62.34
.817	.248 58.86	3167	71 32 19.72	65.32	.867	.259 058.9	3019	72 25 29.27	62.28
.818	.248 90.46	3164	71 33 25.06	65.25	.868	.259 364.2	3017	72 26 31.47	62.22
.819	.249 22.08	3161	71 34 30.28	65.19	.869	.259 669.3	3014	72 27 33.67	62.16
1.820	1.249 53.67	3158	71 35 35.44	65.13	1.870	1.259 975.5	3011	72 28 35.86	62.11
.821	.249 85.43	3155	71 36 40.51	65.07	.871	.259 280.6	3008	72 29 37.83	62.05
.822	.250 16.66	3152	71 37 45.58	65.01	.872	.259 585.7	3005	72 30 39.90	62.00
.823	.250 48.36	3149	71 38 50.56	64.95	.873	.259 890.5	3002	72 31 41.87	61.93
.824	.250 79.73	3146	71 39 55.47	64.88	.874	.259 195.0	2999	72 32 43.75	61.87
1.825	1.251 116.8	3143	71 41 00.32	64.81	1.875	1.259 499.3	2997	72 33 45.59	61.81
.826	.251 42.59	3140	71 42 05.11	64.76	.876	.259 803.6	2994	72 34 47.37	61.75
.827	.251 73.97	3137	71 43 09.81	64.70	.877	.259 108.1	2991	72 35 49.09	61.69
.828	.252 05.32	3134	71 44 14.51	64.64	.878	.259 412.1	2988	72 36 50.75	61.63
.829	.252 36.64	3131	71 45 19.12	64.58	.879	.259 716.3	2985	72 37 52.33	61.57
1.830	1.252 679.1	3128	71 46 23.67	64.52	1.880	1.259 993.1	2982	72 38 53.84	61.52
.831	.253 00.00	3125	71 47 28.15	64.45	.881	.259 298.2	2979	72 39 55.30	61.46
.832	.253 31.43	3122	71 48 32.57	64.39	.882	.259 603.0	2977	72 40 56.81	61.40
.833	.253 62.84	3119	71 49 36.91	64.33	.883	.259 907.5	2974	72 41 58.19	61.34
.834	.253 94.21	3116	71 50 41.24	64.27	.884	.259 142.3	2971	72 42 59.56	61.28
1.835	1.254 239.6	3113	71 51 45.43	64.21	1.885	1.259 446.3	2968	72 44 00.75	61.22
.836	.254 55.07	3110	71 52 49.60	64.15	.886	.259 750.4	2965	72 45 01.94	61.16
.837	.254 86.06	3107	71 53 53.72	64.09	.887	.259 1053.3	2962	72 46 03.08	61.11
.838	.255 17.11	3104	71 54 57.83	64.03	.888	.259 407.0	2959	72 47 04.15	61.05
.839	.255 48.24	3101	71 56 01.83	63.97	.889	.259 710.3	2957	72 48 05.17	60.99
1.840	1.255 792.3	3098	71 57 05.76	63.91	1.890	1.259 993.3	2954	72 49 06.13	60.93
.841	.256 10.20	3095	71 58 09.61	63.84	.891	.259 297.0	2951	72 50 07.03	60.87
.842	.256 41.14	3092	71 59 13.45	63.78	.892	.259 600.6	2948	72 51 07.88	60.81
.843	.256 72.05	3089	72 00 17.21	63.72	.893	.259 903.3	2945	72 52 08.69	60.75
.844	.257 02.93	3086	72 01 20.90	63.66	.894	.259 146.7	2943	72 53 09.39	60.70
1.845	1.257 332.8	3083	72 02 24.53	63.60	1.895	1.259 449.3	2940	72 54 10.00	60.64
.846	.257 64.60	3081	72 03 28.10	63.54	.896	.259 752.7	2937	72 55 10.52	60.58
.847	.257 95.39	3078	72 04 31.61	63.48	.897	.259 1055.1	2934	72 56 11.23	60.52
.848	.258 26.15	3075	72 05 35.06	63.42	.898	.259 407.4	2932	72 57 11.77	60.47
.849	.258 56.88	3072	72 06 38.45	63.36	.899	.259 709.5	2929	72 58 12.16	60.41
1.850	1.258 873.9	3069	72 07 41.78	63.30	1.900	1.259 993.3	2926	72 59 12.51	60.35
$\frac{2 \tan^{-1}(\omega u)}{2} = \omega \operatorname{sech} u \quad 2 \tan^{-1}(\omega u) = 2\omega u \quad \omega \operatorname{sech} u \quad u \quad 2 \tan^{-1}(\omega u) = \frac{\pi}{2} \quad \omega \operatorname{sech} u \quad 2 \tan^{-1}(\omega u) = \frac{\pi}{2} \quad \omega \operatorname{sech} u$									

The Gudermannian.

$u$	$\sin u$	$\omega F_0'$	$\sin u$	$\omega F_0'$	$u$	$\sin u$	$\omega F_0'$	$\sin u$	$\omega F_0'$
1.000	1.273 8003	29.36	73 50 12.54	60.35	1.950	1.288 1451	2789	73 48 19.01	57.53
.001	.274 15.27	29.34	73 00 12.85	60.29	.951	.288 4239	2786	73 49 16.51	57.47
.002	.274 44.49	29.30	73 01 13.13	60.24	.952	.288 70.1	2784	73 50 13.95	57.42
.003	.274 73.68	29.18	73 02 13.33	60.18	.953	.288 98.06	2781	73 51 11.34	57.36
.004	.275 02.84	29.15	73 03 13.48	60.12	.954	.289 25.86	2778	73 52 08.68	57.31
1.005	1.275 31.07	29.12	73 04 13.58	60.06	1.955	1.289 53.63	2776	73 53 05.96	57.25
.006	.275 60.68	29.00	73 05 13.61	60.01	.956	.289 81.37	2773	73 54 03.18	57.20
.007	.275 90.16	29.06	73 06 13.59	59.95	.957	.290 09.09	2770	73 55 00.35	57.14
.008	.276 19.21	29.01	73 07 13.51	59.89	.958	.290 36.78	2768	73 55 57.46	57.09
.009	.276 48.33	29.01	73 08 13.37	59.83	.959	.290 64.44	2765	73 56 54.52	57.03
1.010	1.276 77.43	28.88	73 09 13.18	59.78	1.960	1.290 92.08	2762	73 57 51.53	56.98
.011	.277 06.69	28.85	73 10 12.92	59.72	.961	.291 19.69	2760	73 58 48.48	56.92
.012	.277 35.13	28.84	73 11 12.64	59.66	.962	.291 47.27	2757	73 59 45.38	56.87
.013	.277 63.91	28.80	73 12 12.25	59.61	.963	.291 74.83	2754	74 00 42.22	56.81
.014	.277 92.92	28.87	73 13 11.83	59.55	.964	.292 02.36	2752	74 01 39.00	56.76
1.015	1.278 21.78	28.81	73 14 11.35	59.49	1.965	1.292 29.87	2749	74 02 35.73	56.70
.016	.278 50.61	28.81	73 15 10.81	59.43	.966	.292 57.34	2746	74 03 32.41	56.65
.017	.278 79.11	28.70	73 16 10.22	59.38	.967	.292 84.80	2744	74 04 29.03	56.60
.018	.279 08.18	28.70	73 17 09.56	59.32	.968	.293 12.22	2741	74 05 25.60	56.54
.019	.279 36.93	28.73	73 18 08.89	59.26	.969	.293 39.62	2739	74 06 22.12	56.49
1.020	1.279 65.65	28.70	73 19 08.09	59.21	1.970	1.293 66.99	2736	74 07 18.58	56.43
.021	.279 94.34	28.68	73 20 07.27	59.15	.971	.293 94.31	2733	74 08 14.98	56.38
.022	.280 23.00	28.65	73 21 06.39	59.09	.972	.294 21.66	2731	74 09 11.33	56.32
.023	.280 51.64	28.62	73 22 05.46	59.04	.973	.294 48.95	2728	74 10 07.63	56.27
.024	.280 80.21	28.59	73 23 04.47	58.98	.974	.294 76.22	2725	74 11 03.87	56.22
1.025	1.281 08.83	28.57	73 24 03.42	58.92	1.975	1.295 03.46	2723	74 12 00.06	56.16
.026	.281 37.33	28.54	73 25 02.32	58.87	.976	.295 30.68	2720	74 12 56.20	56.11
.027	.281 65.90	28.51	73 26 01.16	58.81	.977	.295 57.86	2718	74 13 52.28	56.05
.028	.281 94.49	28.49	73 26 59.94	58.76	.978	.295 85.03	2715	74 14 48.30	56.00
.029	.282 22.88	28.46	73 27 58.67	58.70	.979	.296 12.16	2712	74 15 44.28	55.95
1.030	1.282 51.32	28.43	73 28 57.34	58.64	1.980	1.296 39.27	2710	74 16 40.20	55.89
.031	.282 79.71	28.40	73 29 55.95	58.59	.981	.296 66.36	2707	74 17 36.06	55.84
.032	.283 08.13	28.35	73 30 54.51	58.53	.982	.296 93.42	2705	74 18 31.87	55.78
.033	.283 36.49	28.35	73 31 53.01	58.47	.983	.297 20.45	2702	74 19 27.63	55.73
.034	.283 64.83	28.32	73 32 51.46	58.42	.984	.297 47.45	2699	74 20 23.34	55.68
1.035	1.283 93.13	28.29	73 33 49.85	58.36	1.985	1.297 74.43	2697	74 21 18.99	55.62
.036	.284 21.41	28.27	73 34 48.18	58.31	.986	.298 01.39	2694	74 22 14.58	55.57
.037	.284 49.67	28.24	73 35 46.46	58.25	.987	.298 28.32	2692	74 23 10.13	55.52
.038	.284 77.89	28.21	73 36 44.68	58.19	.988	.298 55.22	2689	74 24 05.62	55.46
.039	.285 06.09	28.19	73 37 42.85	58.14	.989	.298 82.10	2686	74 25 01.05	55.41
1.040	1.285 34.27	28.16	73 38 40.96	58.08	1.990	1.299 08.95	2684	74 25 56.44	55.36
.041	.285 62.41	28.13	73 39 39.01	58.03	.991	.299 35.77	2681	74 26 51.77	55.30
.042	.285 90.53	28.11	73 40 37.01	57.97	.992	.299 62.57	2679	74 27 47.04	55.25
.043	.286 18.62	28.08	73 41 34.95	57.92	.993	.299 89.34	2676	74 28 42.27	55.20
.044	.286 46.69	28.05	73 42 32.84	57.86	.994	.300 16.09	2673	74 29 37.44	55.14
1.045	1.286 74.73	28.02	73 43 30.68	57.80	1.995	1.300 42.81	2671	74 30 32.55	55.09
.046	.287 02.74	28.00	73 44 28.45	57.75	.996	.300 69.51	2668	74 31 27.62	55.04
.047	.287 30.72	27.97	73 45 26.17	57.69	.997	.300 96.18	2665	74 32 22.63	54.98
.048	.287 58.68	27.94	73 46 23.84	57.64	.998	.301 22.82	2663	74 33 17.59	54.93
.049	.287 86.61	27.93	73 47 21.45	57.58	.999	.301 49.44	2661	74 34 12.49	54.88
1.950	1.288 1451	2789	73 48 19.01	57.53	2.000	1.301 76.03	2658	74 35 07.34	54.83
$u$	$2 \tan^{-1}(\omega u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\omega u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(\omega u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\omega u) - 90^\circ$	$\omega \operatorname{sech} u$



The Gudermannian.

$u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$u$	$\operatorname{gd} u$	$\operatorname{sech} u$	$\operatorname{gd} u$	$\operatorname{sech} u$
2.000	1.301 2603	2658	74 35 07.34	54.83	2.050	1.314 7449	2533	75 19 43.53	56.44
.001	.302 0250	2655	74 36 02.04	54.72	.051	.314 9589	2530	75 20 36.75	56.40
.002	.302 3914	2653	74 36 56.80	54.72	.052	.315 2490	2528	75 21 27.00	56.41
.003	.302 5576	2650	74 37 51.58	54.67	.053	.315 4930	2525	75 22 16.00	56.09
.004	.302 8215	2648	74 38 46.22	54.61	.054	.315 7400	2523	75 23 12.00	56.04
2.005	1.303 0801	2645	74 39 40.31	54.53	2.055	1.315 6382	2520	75 24 04.11	56.00
.005	.303 3505	2643	74 40 35.35	54.51	.056	.316 2501	2518	75 24 56.07	56.01
.007	.303 6142	2640	74 41 29.81	54.46	.057	.316 5043	2516	75 25 47.08	56.36
.008	.303 8785	2638	74 42 24.26	54.40	.058	.317 7543	2514	75 26 39.35	56.34
.009	.304 1422	2635	74 43 18.64	54.35	.059	.317 0041	2511	75 27 31.00	56.70
2.010	1.304 4056	2633	74 44 13.92	54.30	2.060	1.317 3531	2508	75 28 21.14	56.71
.011	.304 6682	2630	74 45 09.24	54.35	.061	.317 5001	2509	75 29 13.14	56.69
.012	.304 9316	2627	74 46 04.46	54.49	.062	.317 7500	2504	75 30 06.20	56.64
.013	.305 0113	2625	74 46 59.63	54.44	.063	.318 0043	2501	75 30 58.40	56.59
.014	.305 1566	2622	74 47 49.71	54.09	.064	.318 2588	2499	75 31 49.01	56.54
2.015	1.305 2187	2620	74 48 43.81	54.04	2.065	1.318 5095	2495	75 32 41.19	56.49
.016	.305 6805	2617	74 49 37.33	54.09	.066	.318 7590	2494	75 33 34.05	56.44
.017	.305 5431	2615	74 50 31.78	53.93	.067	.319 0053	2491	75 34 27.32	56.39
.018	.306 5045	2612	74 51 25.69	53.88	.068	.319 2543	2489	75 35 18.73	56.34
.019	.306 7045	2610	74 52 19.54	53.84	.069	.319 5031	2487	75 36 07.04	56.29
2.020	1.307 0254	2607	74 53 13.35	53.78	2.070	1.319 7510	2484	75 36 58.31	56.24
.021	.307 2850	2605	74 54 07.10	53.73	.071	.319 9999	2483	75 37 49.56	56.19
.022	.307 5461	2602	74 55 00.80	53.67	.072	.320 2490	2479	75 38 40.66	56.14
.023	.307 8065	2600	74 55 54.45	53.62	.073	.320 4988	2477	75 39 31.30	56.09
.024	.308 0661	2597	74 56 48.05	53.57	.074	.320 7483	2475	75 40 22.87	56.04
2.025	1.308 3250	2595	74 57 41.50	53.52	2.075	1.320 9967	2472	75 41 13.46	56.00
.026	.308 5853	2592	74 58 35.03	53.47	.076	.321 2453	2470	75 42 04.03	56.01
.027	.308 8443	2590	74 59 28.53	53.42	.077	.321 4940	2467	75 42 55.77	56.36
.028	.309 1033	2587	75 00 21.91	53.36	.078	.321 7422	2465	75 43 46.64	56.34
.029	.309 3618	2585	75 01 15.45	53.31	.079	.321 9909	2463	75 44 37.44	56.79
2.030	1.309 6201	2582	75 02 08.54	53.36	2.080	1.322 2383	2461	75 45 28.24	56.75
.031	.309 8782	2580	75 03 01.78	53.21	.081	.322 4862	2458	75 46 18.95	56.70
.032	.310 1361	2577	75 03 54.96	53.16	.082	.322 7343	2455	75 47 09.66	56.65
.033	.310 3946	2575	75 04 48.09	53.11	.083	.322 9823	2453	75 48 00.34	56.60
.034	.310 6510	2572	75 05 41.17	53.06	.084	.323 2300	2451	75 48 50.85	56.55
2.035	1.310 9081	2570	75 06 34.30	53.01	2.085	1.323 4769	2448	75 49 41.34	56.50
.036	.311 1649	2567	75 07 27.18	52.95	.086	.323 7240	2446	75 50 31.87	56.45
.037	.311 4215	2565	75 08 20.11	52.90	.087	.323 9701	2444	75 51 22.35	56.40
.038	.311 6779	2562	75 09 12.99	52.85	.088	.324 2163	2441	75 52 12.62	56.35
.039	.311 9340	2560	75 10 05.81	52.80	.089	.324 4623	2439	75 53 02.65	56.30
2.040	1.312 1898	2557	75 10 58.59	52.75	2.090	1.324 7081	2436	75 53 53.34	56.26
.041	.312 4455	2555	75 11 51.31	52.70	.091	.324 9536	2434	75 54 43.96	56.21
.042	.312 7008	2552	75 12 43.98	52.65	.092	.325 1990	2432	75 55 34.60	56.16
.043	.312 9559	2550	75 13 36.60	52.60	.093	.325 4443	2429	75 56 25.28	56.11
.044	.313 2108	2547	75 14 29.17	52.55	.094	.325 6893	2427	75 57 15.86	56.06
2.045	1.313 4654	2545	75 15 21.66	52.49	2.095	1.325 9351	2425	75 58 06.00	56.01
.046	.313 7203	2543	75 16 14.16	52.44	.096	.326 1807	2422	75 58 56.33	56.06
.047	.313 9739	2540	75 17 06.58	52.39	.097	.326 4268	2420	75 59 46.83	56.02
.048	.314 2278	2538	75 17 58.95	52.34	.098	.326 6727	2418	76 00 37.27	56.37
.049	.314 4815	2535	75 18 51.27	52.29	.099	.326 9183	2415	76 01 27.59	56.32
2.050	1.314 7349	2533	75 19 43.53	52.24	2.100	1.327 0683	2413	76 02 18.36	49.72
$u \quad 2 \ln \operatorname{sech}^{-1}(u) - \frac{\pi}{2} \quad \operatorname{sech} u \quad 2 \ln \operatorname{sech}^{-1}(u) - 00^u \quad \operatorname{sech} u \quad u \quad 2 \ln \operatorname{sech}^{-1}(u) - \frac{\pi}{2} \quad \operatorname{sech} u \quad 2 \ln \operatorname{sech}^{-1}(u) - 90^u \quad \operatorname{sech} u$									

GAN TABLE

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$	$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$
2.100	1.337 08085	3413	76 02 13.36	49.77	2.150	1.338 8732	2298	76 42 42.42	47.41
.101	.337 3384	3411	76 03 03.11	49.73	.151	.339 1020	2296	76 43 29.81	47.36
.102	.337 5589	3408	76 03 52.80	49.67	.152	.339 3325	2294	76 44 17.15	47.32
.103	.337 8164	3404	76 04 42.45	49.63	.153	.339 5617	2292	76 45 04.41	47.27
.104	.338 0801	3401	76 05 32.00	49.58	.154	.339 7908	2290	76 45 51.69	47.23
2.105	1.338 3003	3391	76 06 21.61	49.53	2.155	1.340 0167	2287	76 46 38.89	47.18
.106	.338 5404	3389	76 07 11.11	49.48	.155	.340 2483	2285	76 47 26.05	47.13
.107	.338 7801	3387	76 08 00.57	49.43	.157	.340 4767	2283	76 48 13.16	47.09
.108	.339 0167	3384	76 08 49.68	49.39	.158	.340 7040	2281	76 49 00.23	47.04
.109	.339 2500	3382	76 09 39.34	49.34	.159	.340 9328	2278	76 49 47.25	47.00
2.110	1.339 4980	3370	76 10 28.66	49.29	2.160	1.341 1605	2276	76 50 34.22	46.95
.111	.339 7300	3367	76 11 17.92	49.24	.161	.341 3881	2274	76 51 21.15	46.90
.112	.339 9755	3365	76 12 07.14	49.19	.162	.341 6153	2272	76 52 08.03	46.86
.113	.340 2139	3363	76 12 56.31	49.15	.163	.341 8421	2270	76 52 54.87	46.81
.114	.340 4520	3360	76 13 45.43	49.10	.164	.342 0693	2267	76 53 41.66	46.77
2.115	1.340 6900	3378	76 14 34.51	49.05	2.165	1.342 2950	2265	76 54 28.40	46.72
.116	.340 9277	3376	76 15 23.54	49.00	.166	.342 5223	2263	76 55 15.10	46.68
.117	.341 1631	3373	76 16 12.52	48.96	.167	.342 7485	2261	76 56 01.76	46.63
.118	.341 3983	3371	76 17 01.45	48.91	.168	.342 9744	2259	76 56 48.36	46.59
.119	.341 6303	3369	76 17 50.33	48.86	.169	.343 2002	2256	76 57 34.93	46.54
2.120	1.341 8761	3367	76 18 39.17	48.81	2.170	1.343 4257	2254	76 58 21.45	46.50
.121	.342 1127	3364	76 19 27.99	48.77	.171	.343 6510	2252	76 59 07.92	46.45
.122	.342 3490	3362	76 20 16.70	48.72	.172	.343 8761	2250	76 59 54.35	46.41
.123	.342 5850	3360	76 21 05.40	48.67	.173	.344 1010	2248	77 00 40.73	46.36
.124	.342 8209	3357	76 21 54.04	48.62	.174	.344 3256	2245	77 01 27.07	46.31
2.125	1.343 0608	3355	76 22 42.64	48.58	2.175	1.344 5501	2243	77 02 13.36	46.27
.126	.343 2910	3353	76 23 31.30	48.53	.176	.344 7743	2241	77 02 59.61	46.22
.127	.343 5271	3350	76 24 19.70	48.48	.177	.344 9983	2239	77 03 45.81	46.18
.128	.343 7630	3348	76 25 08.16	48.44	.178	.345 2220	2237	77 04 31.96	46.13
.129	.343 9977	3346	76 25 55.57	48.39	.179	.345 4456	2234	77 05 18.08	46.09
2.130	1.344 2412	3344	76 26 44.94	48.34	2.180	1.345 6689	2232	77 06 04.14	46.04
.131	.344 4751	3341	76 27 33.30	48.29	.181	.345 8921	2230	77 06 50.17	46.00
.132	.344 7095	3339	76 28 21.53	48.25	.182	.346 1150	2228	77 07 36.14	45.95
.133	.344 9433	3337	76 29 09.75	48.20	.183	.346 3377	2226	77 08 22.08	45.91
.134	.345 1668	3335	76 29 57.93	48.15	.184	.346 5601	2224	77 09 07.96	45.87
2.135	1.345 4002	3332	76 30 46.06	48.11	2.185	1.346 7824	2221	77 09 53.81	45.82
.136	.345 6343	3330	76 31 34.14	48.06	.186	.347 0041	2219	77 10 39.60	45.78
.137	.345 8682	3328	76 32 22.18	48.01	.187	.347 2262	2217	77 11 25.36	45.73
.138	.346 1019	3325	76 33 10.17	47.97	.188	.347 4478	2215	77 12 11.07	45.69
.139	.346 3353	3323	76 33 58.11	47.92	.189	.347 6692	2213	77 12 56.73	45.64
2.140	1.346 5685	3321	76 34 46.01	47.87	2.190	1.347 8904	2211	77 13 42.35	45.60
.141	.346 8025	3319	76 35 33.80	47.83	.191	.348 1114	2208	77 14 27.93	45.55
.142	.347 0372	3316	76 36 21.66	47.78	.192	.348 3321	2206	77 15 13.46	45.51
.143	.347 2718	3314	76 37 09.42	47.73	.193	.348 5526	2204	77 15 58.95	45.46
.144	.347 5061	3312	76 37 57.13	47.69	.194	.348 7729	2202	77 16 44.39	45.42
2.145	1.347 7393	3310	76 38 44.79	47.64	2.195	1.348 9930	2200	77 17 29.79	45.38
.146	.347 9740	3307	76 39 32.41	47.59	.196	.349 2129	2198	77 18 15.14	45.33
.147	.348 2086	3305	76 40 19.98	47.55	.197	.349 4326	2196	77 19 00.45	45.29
.148	.348 4431	3303	76 41 07.51	47.50	.198	.349 6520	2193	77 19 45.72	45.24
.149	.348 6774	3301	76 41 54.99	47.46	.199	.349 8713	2191	77 20 30.94	45.20
2.150	1.348 8732	2298	76 42 42.42	47.41	2.200	1.350 0903	2189	77 21 16.11	45.16
$u$	$2 \tan^{-1}(\operatorname{sech} u) - \frac{\pi}{2}$	$\operatorname{sech} u$	$2 \tan^{-1}(\operatorname{sech} u) - \frac{\pi}{2}$	$\operatorname{sech} u$	$u$	$2 \tan^{-1}(\operatorname{sech} u) - \frac{\pi}{2}$	$\operatorname{sech} u$	$2 \tan^{-1}(\operatorname{sech} u) - \frac{\pi}{2}$	$\operatorname{sech} u$

The Gudermannian.

$u$	$\sinh u$	$\cosh u$	$\tanh u$	$\operatorname{sech} u$	$u$	$\sinh u$	$\cosh u$	$\tanh u$	$\operatorname{sech} u$
2.200	1.350 0903	2189	77 21 16.11	45.10	2.250	1.340 7733	2085	77 57 59.94	43.00
.201	.350 3991	2187	77 22 01.25	45.11	.251	.340 6312	2083	77 58 43.01	42.99
.202	.350 5477	2185	77 22 46.31	45.07	.252	.341 1869	2081	77 59 25.59	42.98
.203	.350 7161	2183	77 23 31.38	45.02	.253	.341 3928	2079	78 00 08.10	42.98
.204	.350 9043	2181	77 24 16.38	44.98	.254	.341 6050	2077	78 00 51.34	42.93
2.205	1.351 1822	2179	77 25 01.34	44.91	2.255	1.341 8132	2075	78 01 34.33	42.90
.206	.351 4000	2176	77 25 46.38	44.89	.256	.342 0205	2073	78 02 16.99	42.75
.207	.351 6175	2174	77 26 31.43	44.85	.257	.342 2277	2071	78 02 59.63	42.71
.208	.351 8348	2172	77 27 15.95	44.80	.258	.342 4347	2069	78 03 42.32	42.67
.209	.352 0519	2170	77 28 00.73	44.75	.259	.342 6414	2067	78 04 24.97	42.64
2.210	1.352 2688	2168	77 28 45.47	44.72	2.260	1.342 8480	2065	78 05 07.57	42.58
.211	.352 4855	2166	77 29 30.16	44.67	.261	.343 0543	2063	78 05 50.13	42.51
.212	.352 7020	2164	77 30 14.82	44.63	.262	.343 2605	2061	78 06 32.66	42.50
.213	.352 9183	2162	77 30 59.42	44.59	.263	.343 4665	2059	78 07 15.14	42.49
.214	.353 1343	2159	77 31 43.99	44.51	.264	.343 6722	2056	78 07 57.57	42.43
2.215	1.353 3502	2157	77 32 28.51	44.50	2.265	1.343 8777	2054	78 08 39.97	42.38
.216	.353 5658	2155	77 33 13.69	44.46	.266	.344 0831	2052	78 09 22.33	42.33
.217	.353 7812	2153	77 33 57.42	44.41	.267	.344 2883	2050	78 10 04.64	42.29
.218	.353 9964	2151	77 34 41.81	44.37	.268	.344 4931	2048	78 10 46.91	42.25
.219	.354 2114	2149	77 35 25.15	44.33	.269	.344 6979	2046	78 11 29.14	42.21
2.220	1.354 4262	2147	77 36 10.46	44.33	2.270	1.344 9024	2044	78 12 11.31	42.17
.221	.354 6408	2145	77 36 51.72	44.24	.271	.345 1068	2042	78 12 53.48	42.13
.222	.354 8552	2143	77 37 33.91	44.20	.272	.345 3109	2040	78 13 35.59	42.09
.223	.355 0693	2141	77 38 15.11	44.15	.273	.345 5149	2038	78 14 17.66	42.06
.224	.355 2833	2138	77 38 56.24	44.11	.274	.345 7186	2036	78 14 59.68	42.00
2.225	1.355 4970	2136	77 39 37.43	44.07	2.275	1.345 9221	2034	78 15 41.66	41.96
.226	.355 7106	2134	77 40 18.58	44.02	.276	.346 1255	2032	78 16 23.61	41.92
.227	.355 9239	2132	77 41 00.38	43.98	.277	.346 3286	2030	78 17 05.51	41.88
.228	.356 1370	2130	77 41 42.31	43.94	.278	.346 5316	2028	78 17 47.37	41.84
.229	.356 3499	2128	77 42 24.25	43.89	.279	.346 7343	2026	78 18 29.19	41.80
2.230	1.356 5626	2126	77 43 06.13	43.85	2.281	1.346 9379	2024	78 19 10.97	41.76
.231	.356 7751	2124	77 43 48.00	43.81	.282	.347 1402	2022	78 19 52.71	41.72
.232	.356 9874	2122	77 44 29.73	43.77	.283	.347 3424	2020	78 20 34.40	41.68
.233	.357 2005	2120	77 45 11.39	43.72	.284	.347 5443	2018	78 21 16.05	41.64
.234	.357 4114	2118	77 45 52.99	43.68	.285	.347 7454	2017	78 21 57.63	41.60
2.235	1.357 6230	2116	77 46 34.85	43.64	2.285	1.347 9465	2015	78 22 39.25	41.55
.236	.357 8345	2114	77 47 16.47	43.60	.286	.348 1469	2013	78 23 20.78	41.51
.237	.358 0457	2111	77 47 58.01	43.55	.287	.348 3469	2011	78 24 02.23	41.47
.238	.358 2568	2109	77 48 39.57	43.51	.288	.348 5466	2009	78 24 43.73	41.43
.239	.358 4676	2107	77 49 21.06	43.47	.289	.348 7460	2007	78 25 25.14	41.39
2.240	1.358 6783	2105	77 50 02.51	43.43	2.290	1.348 9455	2005	78 26 06.51	41.35
.241	.358 8887	2103	77 50 43.91	43.38	.291	.349 1450	2003	78 26 47.85	41.31
.242	.359 0989	2101	77 51 25.27	43.34	.292	.349 3441	2001	78 27 29.14	41.27
.243	.359 3089	2099	77 52 06.59	43.30	.293	.349 5430	1999	78 28 10.39	41.23
.244	.359 5187	2097	77 52 47.87	43.26	.294	.349 7418	1997	78 28 51.63	41.19
2.245	1.359 7283	2095	77 53 29.10	43.21	2.295	1.349 9404	1995	78 29 32.77	41.15
.246	.359 9377	2093	77 54 10.29	43.17	.296	.350 1389	1993	78 30 13.89	41.11
.247	.360 1470	2091	77 54 51.41	43.13	.297	.350 3369	1991	78 30 54.93	41.07
.248	.360 3559	2089	77 55 32.55	43.09	.298	.350 5349	1989	78 31 35.93	41.03
.249	.360 5647	2087	77 56 13.62	43.04	.299	.350 7329	1987	78 32 16.91	40.99
2.250	1.360 7733	2085	77 56 54.64	43.00	2.300	1.350 9305	1985	78 32 57.81	40.95
$u$	$2 \tan^{-1}(\sinh u) = \frac{\pi}{2}$	$\operatorname{sech} u$	$2 \tan^{-1}(\sinh u) - 90^\circ$	$\operatorname{sech} u$	$u$	$2 \tan^{-1}(\sinh u) = \frac{\pi}{2}$	$\operatorname{sech} u$	$2 \tan^{-1}(\sinh u) - 90^\circ$	$\operatorname{sech} u$

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$	$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$
2.300	1.370 9168	1688	28 33 58.01	40.95	2.350	1.380 6331	1890	79 06 16.03	38.99
.301	.371 1419	1683	28 33 38.01	40.91	.351	.380 8221	1888	79 06 55.00	38.95
.302	.371 34.41	1681	28 31 19.82	40.87	.352	.381 0908	1885	79 07 33.93	38.91
.303	.371 54.13	1679	28 35 00.67	40.83	.353	.381 1994	1885	79 08 12.82	38.87
.304	.371 72.20	1677	28 35 41.48	40.79	.354	.381 3877	1883	79 08 51.67	38.84
2.305	1.371 93.92	1675	28 36 22.25	40.75	2.355	1.381 5759	1881	79 09 30.49	38.80
.306	.372 13.41	1671	28 37 02.98	40.71	.356	.381 7639	1879	79 10 09.27	38.76
.307	.372 33.11	1673	28 37 43.66	40.66	.357	.381 9517	1877	79 10 48.01	38.72
.308	.372 52.84	1670	28 38 24.31	40.63	.358	.382 1394	1875	79 11 26.71	38.68
.309	.372 72.53	1668	28 39 04.92	40.59	.359	.382 3268	1874	79 12 05.37	38.64
2.310	1.372 92.50	1666	28 39 45.49	40.55	2.360	1.382 5141	1872	79 12 44.00	38.61
.311	.372 118.5	1661	28 40 26.03	40.51	.361	.382 7012	1870	79 13 22.59	38.57
.312	.372 314.8	1662	28 41 06.51	40.47	.362	.382 8881	1868	79 14 01.14	38.53
.313	.372 510.0	1660	28 41 46.96	40.43	.363	.383 0748	1866	79 14 39.65	38.49
.314	.372 708.8	1658	28 42 27.37	40.39	.364	.383 2613	1864	79 15 18.12	38.46
2.315	1.372 90.35	1656	28 43 07.74	40.35	2.365	1.383 4476	1863	79 15 56.56	38.42
.316	.372 0980	1654	28 43 48.07	40.31	.366	.383 6338	1861	79 16 34.96	38.38
.317	.372 2934	1653	28 44 28.36	40.27	.367	.383 8198	1859	79 17 13.32	38.34
.318	.372 4885	1650	28 45 08.61	40.23	.368	.384 0056	1857	79 17 51.64	38.30
.319	.372 6845	1649	28 45 48.82	40.19	.369	.384 1912	1855	79 18 29.93	38.27
2.320	1.372 8782	1647	28 46 28.99	40.15	2.370	1.384 3766	1853	79 19 08.18	38.23
.321	.372 0733	1645	28 47 09.13	40.11	.371	.384 5619	1852	79 19 46.39	38.19
.322	.372 2673	1643	28 47 49.32	40.07	.372	.384 7470	1850	79 20 24.56	38.15
.323	.372 4614	1641	28 48 29.28	40.04	.373	.384 9318	1848	79 21 02.70	38.12
.324	.372 6554	1639	28 49 09.29	40.00	.374	.385 1165	1846	79 21 40.80	38.08
2.325	1.372 8492	1637	28 49 49.27	39.96	2.375	1.385 3011	1844	79 22 18.86	38.04
.326	.372 0438	1635	28 50 29.21	39.92	.376	.385 4851	1843	79 22 57.88	38.00
.327	.372 2380	1633	28 51 09.10	39.88	.377	.385 6696	1841	79 23 34.87	37.97
.328	.372 4328	1631	28 51 48.66	39.84	.378	.385 8536	1839	79 24 12.81	37.93
.329	.372 6275	1630	28 52 28.28	39.80	.379	.386 0371	1837	79 24 50.73	37.89
2.330	1.372 8154	1628	28 53 08.56	39.76	2.380	1.386 2210	1835	79 25 28.60	37.86
.331	.372 0091	1626	28 53 48.30	39.72	.381	.386 4044	1833	79 26 06.44	37.82
.332	.372 2036	1624	28 54 28.01	39.68	.382	.386 5877	1832	79 26 44.24	37.78
.333	.372 3979	1622	28 55 07.67	39.64	.383	.386 7708	1830	79 27 22.00	37.74
.334	.372 5920	1620	28 55 47.29	39.61	.384	.386 9537	1828	79 27 59.73	37.71
2.335	1.372 7760	1618	28 56 26.88	39.57	2.385	1.387 1361	1826	79 28 37.41	37.67
.336	.372 9696	1616	28 57 06.43	39.53	.386	.387 3189	1824	79 29 15.07	37.63
.337	.373 1631	1614	28 57 45.91	39.49	.387	.387 5013	1823	79 29 52.68	37.60
.338	.373 3568	1613	28 58 25.30	39.45	.388	.387 6831	1821	79 30 30.26	37.56
.339	.373 5497	1611	28 59 04.84	39.41	.389	.387 8655	1819	79 31 07.80	37.52
2.340	1.373 7336	1609	28 59 44.23	39.37	2.390	1.388 0473	1817	79 31 45.30	37.49
.341	.373 9274	1607	29 00 23.58	39.33	.391	.388 2289	1816	79 32 22.77	37.45
.342	.374 1150	1605	29 01 02.89	39.30	.392	.388 4101	1814	79 33 00.20	37.41
.343	.374 3054	1603	29 01 42.17	39.26	.393	.388 5917	1812	79 33 37.59	37.37
.344	.374 4957	1601	29 02 21.41	39.22	.394	.388 7728	1810	79 34 14.95	37.34
2.345	1.374 6852	1600	29 03 00.61	39.18	2.395	1.388 9537	1808	79 34 52.27	37.30
.346	.374 8756	1698	29 03 39.77	39.14	.396	.389 1345	1807	79 35 29.55	37.26
.347	.375 0652	1696	29 04 18.89	39.10	.397	.389 3150	1805	79 36 06.80	37.23
.348	.375 2547	1694	29 04 57.97	39.06	.398	.389 4954	1803	79 36 44.01	37.19
.349	.375 4440	1692	29 05 37.02	39.03	.399	.389 6757	1801	79 37 21.18	37.15
2.350	1.380 6331	1890	79 06 16.03	38.99	2.400	1.389 8557	1800	79 37 58.32	37.12
$u$	$2 \operatorname{tanh}^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \operatorname{tanh}^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \operatorname{tanh}^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \operatorname{tanh}^{-1}(e^u) - 90^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

$u$	$\sinh u$	$\cosh u$	$\tanh u$	$\operatorname{sech} u$	$\alpha$	$\sinh \alpha$	$\cosh \alpha$	$\tanh \alpha$	$\operatorname{sech} \alpha$
2.400	1.389 8557	1800	79.37 58.32	37.12	2.450	1.398 6150	1713	80.03 08.33	35.34
.401	.390 0356	1798	79.38 35.42	37.08	.451	.398 8509	1711	80.03 11.03	35.30
.402	.390 2153	1796	79.39 12.48	37.05	.452	.398 9779	1710	80.03 13.01	35.27
.403	.390 3948	1794	79.39 49.51	37.01	.453	.399 1183	1708	80.03 55.10	35.23
.404	.390 5741	1792	79.40 26.50	36.97	.454	.399 3105	1706	80.04 30.37	35.20
2.405	1.390 7533	1791	79.41 03.45	36.94	2.455	1.399 4901	1705	80.11 03.35	35.16
.406	.390 9323	1789	79.41 40.37	36.90	.456	.399 6605	1703	80.11 40.70	35.13
.407	.391 1111	1787	79.42 17.35	36.86	.457	.399 8392	1701	80.12 17.34	35.09
.408	.391 2897	1785	79.42 54.10	36.83	.458	.399 9907	1700	80.12 54.34	35.06
.409	.391 4681	1784	79.43 30.91	36.79	.459	.399 1706	1698	80.13 31.02	35.02
2.410	1.391 6464	1782	79.44 07.68	36.75	2.460	1.400 3493	1696	80.14 08.03	34.99
.411	.391 8245	1780	79.44 44.42	36.72	.461	.399 5099	1695	80.14 45.10	34.95
.412	.392 0025	1778	79.45 21.12	36.68	.462	.399 6703	1693	80.15 22.34	34.92
.413	.392 1802	1777	79.45 57.78	36.65	.463	.399 8305	1691	80.15 59.74	34.89
.414	.392 3578	1775	79.46 34.41	36.61	.464	.399 9917	1690	80.16 36.61	34.85
2.415	1.392 5352	1773	79.47 11.00	36.57	2.465	1.401 1851	1688	80.16 55.45	34.82
.416	.392 7131	1771	79.47 47.56	36.54	.466	.399 3554	1689	80.17 32.35	34.78
.417	.392 8905	1770	79.48 24.08	36.50	.467	.399 5247	1685	80.18 09.01	34.75
.418	.393 0664	1768	79.49 00.57	36.47	.468	.399 6931	1683	80.18 45.74	34.71
.419	.393 2431	1766	79.49 37.02	36.43	.469	.399 8603	1681	80.19 22.44	34.68
2.420	1.393 4196	1764	79.50 13.43	36.39	2.470	1.402 0383	1680	80.19 49.04	34.65
.421	.393 5960	1763	79.50 49.80	36.35	.471	.399 1999	1678	80.20 25.74	34.61
.422	.393 7722	1761	79.51 26.15	36.32	.472	.399 3609	1676	80.20 52.33	34.58
.423	.393 9482	1759	79.52 02.45	36.29	.473	.399 5215	1675	80.21 28.84	34.54
.424	.394 1240	1758	79.52 38.72	36.25	.474	.399 6820	1674	80.22 05.41	34.51
2.425	1.394 2997	1756	79.53 14.96	36.22	2.475	1.402 8661	1672	80.22 31.91	34.48
.426	.394 4754	1754	79.53 51.15	36.18	.476	.399 8333	1670	80.23 08.39	34.44
.427	.394 6505	1752	79.54 27.32	36.14	.477	.399 9941	1668	80.23 34.79	34.41
.428	.394 8257	1751	79.55 03.44	36.11	.478	.399 3608	1666	80.24 11.15	34.37
.429	.395 0006	1749	79.55 39.54	36.07	.479	.399 5233	1665	80.24 37.54	34.34
2.430	1.395 1751	1747	79.56 15.50	36.04	2.480	1.403 6998	1663	80.25 13.84	34.31
.431	.395 3501	1745	79.56 51.61	36.00	.481	.399 8660	1662	80.25 40.15	34.27
.432	.395 5245	1744	79.57 27.60	35.97	.482	.399 9941	1660	80.26 16.40	34.24
.433	.395 6988	1742	79.58 03.55	35.93	.483	.399 1680	1658	80.27 02.63	34.20
.434	.395 8729	1740	79.58 39.46	35.90	.484	.399 3437	1657	80.27 28.84	34.17
2.435	1.396 0469	1739	79.59 15.34	35.86	2.485	1.404 5303	1655	80.28 05.02	34.14
.436	.396 2207	1737	79.59 51.19	35.83	.486	.399 6947	1653	80.28 31.19	34.10
.437	.396 3943	1735	80.00 26.90	35.79	.487	.399 8600	1652	80.29 07.37	34.07
.438	.396 5677	1733	80.01 02.77	35.76	.488	.399 9954	1650	80.30 02.53	34.04
.439	.396 7410	1732	80.01 38.54	35.72	.489	.399 1900	1648	80.30 28.65	34.00
2.440	1.396 9141	1730	80.02 14.21	35.69	2.490	1.405 3548	1647	80.31 04.73	33.97
.441	.397 0870	1728	80.02 49.88	35.65	.491	.399 5194	1645	80.31 30.79	33.94
.442	.397 2597	1727	80.03 25.51	35.62	.492	.399 6838	1644	80.32 06.81	33.90
.443	.397 4323	1725	80.04 01.11	35.58	.493	.399 8481	1642	80.32 32.80	33.87
.444	.397 6047	1723	80.04 36.67	35.54	.494	.399 9943	1640	80.33 08.84	33.84
2.445	1.397 7770	1722	80.05 12.20	35.51	2.495	1.406 1762	1639	80.33 34.86	33.80
.446	.397 9490	1720	80.05 47.69	35.48	.496	.399 3400	1637	80.34 10.85	33.77
.447	.398 1209	1718	80.06 23.15	35.44	.497	.399 5039	1636	80.34 36.80	33.74
.448	.398 2927	1716	80.06 58.57	35.41	.498	.399 6679	1634	80.35 12.83	33.70
.449	.398 4642	1715	80.07 33.95	35.37	.499	.399 8301	1632	80.35 38.80	33.67
2.450	1.398 6356	1713	80.08 09.31	35.34	2.500	1.406 9936	1631	80.36 14.80	33.64
$u$	$2 \tanh^{-1}(\tanh u) = \frac{\pi}{2}$	$\operatorname{sech} u$	$2 \tanh^{-1}(\tanh u) = 90^\circ$	$\operatorname{sech} u$	$\alpha$	$2 \tanh^{-1}(\tanh \alpha) = \frac{\pi}{2}$	$\operatorname{sech} \alpha$	$2 \tanh^{-1}(\tanh \alpha) = 90^\circ$	$\operatorname{sech} \alpha$

The Gudermannian.

$u$	$\sin u$	$\cos u$	$\sin u$	$\cos u$	$u$	$\sin u$	$\cos u$	$u$	$\sin u$	$\cos u$
1.500	1.406 9236	0.41	80 36 53.26	33.61	2.550	1.414 9492	1552	81 04 14.22	32.02	
.501	1.407 1566	10.9	80 37 26.88	33.60	.551	.415 104.3	1551	81 04 46.22	31.98	
.502	1.407 4044	10.7	80 38 00.46	33.57	.552	.415 259.3	1549	81 05 18.19	31.95	
.503	1.407 6511	10.5	80 38 34.01	33.54	.553	.415 414.2	1548	81 05 50.13	31.92	
.504	1.407 8970	10.4	80 39 07.51	33.50	.554	.415 568.8	1546	81 06 22.03	31.89	
2.505	1.407 8060	10.3	80 39 41.02	33.47	2.555	1.415 723.1	1545	81 06 53.91	31.86	
.506	1.407 0501	10.2	80 40 14.47	33.44	.556	.415 877.8	1543	81 07 25.75	31.83	
.507	1.407 1311	10.0	80 40 47.90	33.40	.557	.416 032.0	1541	81 07 57.56	31.80	
.508	1.408 29.01	10.0	80 41 21.28	33.37	.558	.416 186.0	1540	81 08 29.34	31.76	
.509	1.408 45.17	10.0	80 41 54.64	33.34	.559	.416 340.0	1538	81 09 01.09	31.73	
3.510	1.408 61.03	10.5	80 42 27.66	33.31	3.560	1.416 493.7	1537	81 09 32.80	31.70	
.511	1.408 7777	10.4	80 43 01.25	33.27	.561	.416 647.3	1535	81 10 04.49	31.67	
.512	1.408 9451	10.4	80 43 34.51	33.24	.562	.416 800.8	1534	81 10 36.14	31.64	
.513	1.409 1000	10.0	80 44 07.73	33.21	.563	.416 954.1	1532	81 11 07.77	31.61	
.514	1.409 2569	10.0	80 44 40.92	33.17	.564	.417 107.3	1531	81 11 39.36	31.58	
4.515	1.409 4146	10.0	80 45 14.08	33.14	4.565	1.417 260.3	1529	81 12 10.92	31.54	
.516	1.409 5832	10.0	80 45 47.20	33.11	.566	.417 413.1	1528	81 12 42.45	31.51	
.517	1.409 7442	10.0	80 46 20.30	33.08	.567	.417 565.9	1526	81 13 13.95	31.48	
.518	1.409 9020	10.0	80 46 53.39	33.04	.568	.417 718.4	1525	81 13 45.41	31.45	
.519	1.410 05.41	10.0	80 47 26.48	33.01	.569	.417 870.8	1523	81 14 16.85	31.42	
5.520	1.410 22.30	10.0	80 47 59.58	32.98	5.570	1.418 023.1	1522	81 14 48.25	31.39	
.521	1.410 38.53	10.0	80 48 32.64	32.95	.571	.418 175.2	1520	81 15 19.63	31.36	
.522	1.410 54.78	10.0	80 49 05.67	32.91	.572	.418 327.1	1519	81 15 50.97	31.33	
.523	1.410 70.90	10.0	80 49 38.67	32.88	.573	.418 478.9	1517	81 16 22.28	31.30	
.524	1.410 86.14	10.0	80 50 11.63	32.85	.574	.418 630.6	1516	81 16 53.56	31.27	
6.525	1.411 03.05	10.0	80 50 44.86	32.81	6.575	1.418 782.1	1514	81 17 24.81	31.23	
.526	1.411 19.53	10.0	80 51 18.06	32.78	.576	.418 934.1	1513	81 17 56.03	31.20	
.527	1.411 35.84	10.0	80 51 49.63	32.75	.577	.419 084.7	1511	81 18 27.22	31.17	
.528	1.411 50.71	10.0	80 52 21.17	32.72	.578	.419 235.7	1510	81 18 58.38	31.14	
.529	1.411 65.56	10.0	80 52 52.87	32.69	.579	.419 386.6	1508	81 19 29.50	31.11	
7.530	1.411 81.40	10.0	80 53 24.54	32.65	7.580	1.419 537.1	1507	81 20 00.60	31.08	
.531	1.411 97.53	10.0	80 53 56.18	32.62	.581	.419 688.6	1505	81 20 31.67	31.05	
.532	1.412 13.03	10.0	80 54 27.23	32.59	.582	.419 839.4	1504	81 21 02.70	31.02	
.533	1.412 28.53	10.0	80 54 58.30	32.56	.583	.419 989.8	1502	81 21 33.70	30.99	
.534	1.412 44.00	10.0	80 55 29.90	32.53	.584	.420 139.9	1501	81 22 04.68	30.96	
8.535	1.412 60.36	10.0	80 56 01.41	32.49	8.585	1.420 289.0	1499	81 22 35.62	30.93	
.536	1.412 76.11	10.0	80 56 32.89	32.46	.586	.420 438.8	1498	81 23 06.53	30.90	
.537	1.412 91.84	10.0	80 57 04.33	32.43	.587	.420 588.5	1496	81 23 37.41	30.87	
.538	1.413 07.55	10.0	80 57 35.75	32.40	.588	.420 738.1	1495	81 24 08.26	30.84	
.539	1.413 23.05	10.0	80 58 07.13	32.37	.589	.420 887.5	1493	81 24 39.09	30.81	
9.540	1.413 38.94	10.0	80 58 38.48	32.33	9.590	1.421 036.8	1492	81 25 09.88	30.77	
.541	1.413 54.60	10.0	80 59 09.80	32.30	.591	.421 185.9	1491	81 25 40.63	30.74	
.542	1.413 70.25	10.0	80 59 41.08	32.27	.592	.421 334.9	1489	81 26 11.36	30.71	
.543	1.413 85.86	10.0	81 00 12.34	32.24	.593	.421 483.7	1488	81 26 42.06	30.68	
.544	1.414 01.51	10.0	81 01 01.50	32.21	.594	.421 632.4	1486	81 27 12.73	30.65	
10.545	1.414 17.13	10.0	81 01 33.25	32.17	10.595	1.421 781.0	1485	81 27 43.37	30.62	
.546	1.414 32.71	10.0	81 02 05.01	32.14	.596	.421 929.3	1483	81 28 13.98	30.59	
.547	1.414 48.09	10.0	81 02 36.03	32.11	.597	.422 077.6	1482	81 28 44.55	30.56	
.548	1.414 63.85	10.0	81 03 10.13	32.08	.598	.422 225.7	1480	81 29 15.10	30.53	
.549	1.414 79.39	10.0	81 03 43.19	32.05	.599	.422 373.6	1479	81 29 45.62	30.50	
11.550	1.414 94.94	10.0	81 04 16.22	32.02	11.600	1.422 521.1	1477	81 30 16.11	30.47	
$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$\omega \operatorname{sech} u$

The Gudermannian.

n	gdn	secu	gdn	secu	n	gdn	secu	gdn	secu
2.600	1.422 5214	1.477	81 30 16.11	30.47	2.650	1.439 7333	1.406	81 55 04.03	29.00
.601	1.422 6201	1.476	81 30 16.30	30.44	.651	1.439 8383	1.405	81 55 31.02	29.02
.602	1.422 8166	1.474	81 31 16.00	30.41	.652	1.439 8902	1.403	81 56 00.38	28.04
.603	1.422 9540	1.473	81 31 47.30	30.38	.653	1.439 9405	1.402	81 56 30.51	28.02
.604	1.423 1112	1.471	81 32 17.75	30.35	.654	1.439 9890	1.400	81 57 03.41	28.10
2.605	1.423 3583	1.470	81 32 48.09	30.32	2.655	1.439 4995	1.399	81 57 27.28	28.16
.606	1.423 4053	1.469	81 33 18.40	30.29	.656	1.439 5501	1.398	81 57 56.12	28.14
.607	1.423 5530	1.467	81 33 48.62	30.26	.657	1.439 6001	1.396	81 58 24.64	28.16
.608	1.423 6685	1.466	81 34 18.02	30.23	.658	1.439 6482	1.395	81 58 53.22	28.22
.609	1.423 8151	1.464	81 34 49.04	30.20	.659	1.439 6931	1.394	81 59 22.45	28.24
2.610	1.423 9015	1.463	81 35 19.32	30.17	2.660	1.431 1374	1.393	81 59 51.21	28.22
.611	1.424 1472	1.461	81 35 49.43	30.14	.661	1.431 2805	1.391	81 60 19.01	28.00
.612	1.424 2837	1.460	81 36 19.61	30.11	.662	1.431 4255	1.389	81 60 48.55	28.00
.613	1.424 4302	1.458	81 36 49.72	30.08	.663	1.431 5711	1.388	81 61 17.23	28.03
.614	1.424 5754	1.457	81 37 19.72	30.05	.664	1.431 6840	1.387	81 61 45.81	28.00
2.615	1.424 7211	1.456	81 37 49.81	30.02	2.665	1.431 8217	1.385	81 62 14.43	28.52
.616	1.424 8665	1.454	81 38 19.82	29.99	.666	1.431 9503	1.384	81 62 43.92	28.55
.617	1.425 0119	1.453	81 38 49.80	29.96	.667	1.431 9935	1.383	81 63 11.52	28.50
.618	1.425 1571	1.451	81 39 19.75	29.93	.668	1.431 3369	1.381	81 63 40.02	28.40
.619	1.425 3024	1.450	81 39 49.62	29.90	.669	1.431 3747	1.380	81 64 08.50	28.46
2.620	1.425 4479	1.448	81 40 19.56	29.87	2.670	1.433 5147	1.378	81 64 36.95	28.43
.621	1.425 5911	1.447	81 40 49.43	29.85	.671	1.433 6501	1.377	81 65 05.30	28.40
.622	1.425 7364	1.446	81 41 19.33	29.82	.672	1.433 7831	1.376	81 65 33.75	28.48
.623	1.425 8809	1.444	81 41 49.05	29.79	.673	1.433 9150	1.374	81 66 02.12	28.45
.624	1.426 0252	1.443	81 42 18.83	29.76	.674	1.433 9829	1.373	81 66 30.48	28.41
2.625	1.426 1694	1.441	81 42 48.51	29.73	2.675	1.434 3003	1.371	81 66 58.76	28.40
.626	1.426 3135	1.440	81 43 18.38	29.70	.676	1.434 3373	1.370	81 67 27.03	28.25
.627	1.426 4571	1.438	81 43 47.65	29.67	.677	1.434 4745	1.369	81 67 55.33	28.21
.628	1.426 6012	1.437	81 44 17.61	29.64	.678	1.434 6110	1.368	81 68 23.61	28.41
.629	1.426 7448	1.436	81 44 47.24	29.61	.679	1.434 7472	1.366	81 68 51.20	28.48
2.630	1.426 8883	1.434	81 45 16.83	29.58	2.680	1.434 8813	1.365	81 69 19.36	28.45
.631	1.427 0316	1.433	81 45 46.40	29.55	.681	1.434 9902	1.364	81 69 48.00	28.41
.632	1.427 1748	1.431	81 46 15.91	29.52	.682	1.434 1320	1.363	81 70 16.11	28.40
.633	1.427 3170	1.430	81 46 45.41	29.49	.683	1.434 2933	1.361	81 70 44.30	28.02
.634	1.427 4608	1.428	81 47 14.93	29.46	.684	1.434 4391	1.359	81 71 12.35	28.04
2.635	1.427 6036	1.427	81 47 44.32	29.43	2.685	1.434 5650	1.358	81 71 40.38	28.01
.636	1.427 7463	1.426	81 48 13.79	29.41	.686	1.434 7003	1.357	81 72 08.33	27.99
.637	1.427 8887	1.424	81 48 43.13	29.38	.687	1.434 8361	1.355	81 72 36.25	27.05
.638	1.428 0310	1.423	81 49 12.55	29.35	.688	1.434 9709	1.354	81 73 04.19	27.03
.639	1.428 1732	1.421	81 49 41.88	29.32	.689	1.435 1072	1.353	81 73 32.11	27.00
2.640	1.428 3153	1.420	81 50 11.18	29.29	2.690	1.435 2434	1.351	81 74 00.00	27.12
.641	1.428 4573	1.419	81 50 40.46	29.26	.691	1.435 3775	1.350	81 74 27.30	27.13
.642	1.428 5990	1.417	81 51 09.70	29.23	.692	1.435 5131	1.349	81 74 55.60	27.13
.643	1.428 7407	1.416	81 51 38.93	29.20	.693	1.435 6472	1.347	81 75 23.40	27.20
.644	1.428 8822	1.414	81 52 08.11	29.17	.694	1.435 7819	1.346	81 75 51.32	27.27
2.645	1.429 0236	1.413	81 52 37.27	29.14	2.695	1.435 9164	1.345	81 76 19.03	27.24
.646	1.429 1648	1.412	81 53 06.40	29.12	.696	1.436 0508	1.344	81 76 46.75	27.21
.647	1.429 3050	1.410	81 53 35.50	29.09	.697	1.436 1851	1.343	81 77 14.44	27.08
.648	1.429 4468	1.409	81 54 04.57	29.06	.698	1.436 3193	1.341	81 77 42.11	27.05
.649	1.429 5870	1.407	81 54 33.62	29.03	.699	1.436 4534	1.339	81 78 09.28	27.03
2.650	1.429 7283	1.406	81 55 02.63	29.00	2.700	1.436 5871	1.338	81 78 37.36	27.00
n	$2 \tan^{-1}(u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(u) - 90^\circ$	$\sec u$	n	$2 \tan^{-1}(u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(u) - 90^\circ$	$\sec u$

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$	$u$	$\operatorname{gd} u$	$\omega F_0'$	$\operatorname{gd} u$	$\omega F_0'$
2.700	1.436 3871	1.338	82 18 37.36	27.60	2.750	1.443 1144	1273	82 41 03.70	26.26
2.701	1.436 3876	1.337	82 19 01.95	27.57	2.751	1.443 2416	1272	82 41 29.95	26.24
2.702	1.436 3881	1.336	82 19 32.51	27.54	2.752	1.443 3683	1271	82 41 56.18	26.21
2.703	1.436 3886	1.334	82 20 00.04	27.52	2.753	1.443 4953	1270	82 42 22.38	26.19
2.704	1.437 1313	1.333	82 20 27.51	27.49	2.754	1.443 6227	1268	82 42 48.55	26.16
2.705	1.437 2515	1.331	82 20 55.02	27.46	2.755	1.443 7495	1267	82 43 14.70	26.14
2.706	1.437 3776	1.330	82 21 22.47	27.44	2.756	1.443 8761	1266	82 43 40.82	26.11
2.707	1.437 5038	1.329	82 21 49.84	27.41	2.757	1.441 0026	1265	82 44 06.92	26.08
2.708	1.437 6303	1.327	82 22 17.30	27.38	2.758	1.441 1290	1263	82 44 32.99	26.06
2.709	1.437 7560	1.325	82 22 44.66	27.35	2.759	1.441 2553	1262	82 44 59.03	26.03
2.710	1.437 8816	1.323	82 23 12.00	27.33	2.760	1.441 3814	1261	82 45 25.05	26.01
2.711	1.438 0070	1.324	82 23 39.31	27.30	2.761	1.441 5071	1260	82 45 51.04	25.98
2.712	1.438 1323	1.322	82 24 06.60	27.27	2.762	1.441 6333	1258	82 46 17.01	25.95
2.713	1.438 2574	1.321	82 24 33.86	27.25	2.763	1.441 7591	1257	82 46 42.95	25.93
2.714	1.438 3823	1.320	82 25 01.09	27.22	2.764	1.441 8847	1256	82 47 08.87	25.90
2.715	1.438 5071	1.318	82 25 28.29	27.19	2.765	1.441 0102	1255	82 47 34.76	25.88
2.716	1.438 6318	1.317	82 25 55.47	27.17	2.766	1.441 1356	1253	82 48 00.62	25.85
2.717	1.438 7563	1.316	82 26 22.63	27.14	2.767	1.441 2609	1252	82 48 26.46	25.83
2.718	1.438 8807	1.314	82 26 49.75	27.11	2.768	1.441 3860	1251	82 48 52.27	25.80
2.719	1.439 0052	1.313	82 27 16.85	27.08	2.769	1.441 5111	1250	82 49 18.05	25.77
2.720	1.439 1296	1.311	82 27 43.92	27.06	2.770	1.441 6360	1248	82 49 43.82	25.75
2.721	1.439 2540	1.310	82 28 10.96	27.03	2.771	1.441 7607	1247	82 50 09.56	25.72
2.722	1.439 3783	1.309	82 28 37.98	27.00	2.772	1.441 8854	1246	82 50 35.27	25.70
2.723	1.439 5026	1.308	82 29 04.97	26.98	2.773	1.441 0099	1245	82 51 00.95	25.67
2.724	1.439 6269	1.307	82 29 31.91	26.95	2.774	1.441 1343	1243	82 51 26.61	25.65
2.725	1.439 7512	1.305	82 29 58.87	26.92	2.775	1.441 2586	1242	82 51 52.25	25.62
2.726	1.439 8754	1.304	82 30 25.79	26.90	2.776	1.441 3827	1241	82 52 17.85	25.60
2.727	1.439 9996	1.303	82 30 52.67	26.87	2.777	1.441 5068	1240	82 52 43.44	25.57
2.728	1.440 1237	1.301	82 31 19.53	26.84	2.778	1.441 6307	1238	82 53 09.00	25.55
2.729	1.440 2478	1.300	82 31 46.39	26.81	2.779	1.441 7545	1237	82 53 34.53	25.52
2.730	1.440 3719	1.299	82 32 13.16	26.79	2.780	1.441 8781	1236	82 54 00.04	25.49
2.731	1.440 4959	1.298	82 32 39.91	26.76	2.781	1.441 0017	1235	82 54 25.52	25.47
2.732	1.440 6199	1.296	82 33 06.60	26.74	2.782	1.441 1251	1234	82 54 50.98	25.44
2.733	1.440 7438	1.295	82 33 33.42	26.71	2.783	1.441 2484	1232	82 55 16.41	25.42
2.734	1.441 0667	1.294	82 34 00.11	26.68	2.784	1.441 3716	1231	82 55 41.81	25.39
2.735	1.441 1900	1.293	82 34 26.78	26.66	2.785	1.441 4946	1230	82 56 07.19	25.37
2.736	1.441 3132	1.291	82 34 53.43	26.63	2.786	1.441 6175	1229	82 56 32.55	25.34
2.737	1.441 4364	1.290	82 35 20.05	26.61	2.787	1.441 7403	1227	82 56 57.88	25.32
2.738	1.441 5595	1.289	82 35 46.61	26.58	2.788	1.441 8630	1226	82 57 23.19	25.29
2.739	1.441 6826	1.287	82 36 13.21	26.55	2.789	1.441 9856	1225	82 57 48.47	25.27
2.740	1.441 8057	1.286	82 36 39.75	26.53	2.790	1.441 1080	1224	82 58 13.72	25.24
2.741	1.441 9287	1.285	82 37 06.26	26.50	2.791	1.441 2303	1223	82 58 38.95	25.22
2.742	1.442 0516	1.284	82 37 32.75	26.47	2.792	1.441 3525	1221	82 59 04.16	25.19
2.743	1.442 1745	1.282	82 37 59.21	26.45	2.793	1.441 4746	1220	82 59 29.34	25.17
2.744	1.442 2974	1.281	82 38 25.64	26.42	2.794	1.441 5966	1219	82 59 54.49	25.14
2.745	1.442 4203	1.280	82 38 52.05	26.40	2.795	1.441 7181	1218	83 00 19.62	25.12
2.746	1.442 5432	1.278	82 39 18.43	26.37	2.796	1.441 8401	1217	83 00 44.73	25.09
2.747	1.442 6661	1.277	82 39 44.79	26.34	2.797	1.441 9617	1215	83 01 09.81	25.07
2.748	1.442 7890	1.276	82 40 11.12	26.33	2.798	1.442 0832	1214	83 01 34.86	25.04
2.749	1.442 9119	1.275	82 40 37.42	26.29	2.799	1.442 2045	1213	83 01 59.90	25.02
2.750	1.443 1144	1273	82 41 03.70	26.26	2.800	1.442 3258	1212	83 02 24.90	24.99
$u$	$2 \tan^{-1}(\operatorname{gd} u)$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\operatorname{gd} u)$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(\operatorname{gd} u)$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(\operatorname{gd} u)$	$\omega \operatorname{sech} u$



The Gudermannian.

u	gd u	sec u	gd u	sec u	u	gd u	sec u	gd u	sec u
2.800	1.449 3258	1212	83 02 24.90	24.99	2.850	1.455 2405	1153	83 53 44.02	24.78
.801	.449 4460	1211	83 03 39.38	24.97	.851	.455 3517	1152	83 53 07.34	24.76
.802	.449 5679	1209	83 03 14.81	24.94	.852	.455 4648	1151	83 53 31.58	24.74
.803	.449 6898	1208	83 03 39.77	24.92	.853	.455 5780	1150	83 53 55.81	24.71
.804	.449 8095	1207	83 04 04.68	24.89	.854	.455 6923	1148	83 54 19.01	24.69
2.805	1.449 9301	1205	83 04 29.56	24.87	2.855	1.455 8115	1147	83 54 43.60	24.67
.806	.450 0507	1205	83 04 54.44	24.85	.856	.455 9262	1146	83 55 08.31	24.64
.807	.450 1710	1203	83 05 19.25	24.82	.857	.456 0408	1145	83 55 33.02	24.62
.808	.450 2913	1202	83 05 44.06	24.80	.858	.456 1553	1144	83 55 57.68	24.59
.809	.450 4115	1201	83 06 08.81	24.77	.859	.456 2699	1143	83 56 22.30	24.57
2.810	1.450 5315	1200	83 06 33.60	24.75	2.860	1.456 3833	1142	83 56 46.72	24.55
.811	.450 6514	1199	83 06 58.33	24.72	.861	.456 4979	1140	83 57 01.25	24.53
.812	.450 7712	1198	83 07 23.04	24.70	.862	.456 6110	1139	83 57 25.77	24.50
.813	.450 8909	1196	83 07 47.73	24.67	.863	.456 7253	1138	83 57 50.30	24.48
.814	.451 0105	1195	83 08 12.39	24.65	.864	.456 8395	1137	83 58 14.72	24.45
2.815	1.451 1300	1191	83 08 37.03	24.62	2.865	1.456 9533	1136	83 58 38.16	24.43
.816	.451 2492	1193	83 09 01.64	24.60	.866	.457 0677	1135	83 59 01.58	24.41
.817	.451 3684	1191	83 09 26.23	24.58	.867	.457 1811	1134	83 59 25.93	24.38
.818	.451 4875	1190	83 09 50.79	24.55	.868	.457 2945	1133	83 59 49.68	24.36
.819	.451 6065	1189	83 10 15.33	24.53	.869	.457 4067	1131	83 59 11.20	24.34
2.820	1.451 7253	1188	83 10 39.81	24.50	2.870	1.457 5168	1130	83 59 35.04	24.32
.821	.451 8441	1187	83 11 04.34	24.48	.871	.457 6267	1129	83 59 58.33	24.29
.822	.451 9632	1186	83 11 28.76	24.45	.872	.457 7366	1128	83 59 12.57	24.27
.823	.452 0814	1184	83 11 53.31	24.43	.873	.457 8464	1127	83 59 36.82	24.24
.824	.452 1995	1183	83 12 17.66	24.41	.874	.457 9560	1126	83 59 60.41	24.22
2.825	1.452 3178	1182	83 12 42.05	24.38	2.875	1.458 0645	1125	83 59 31.31	24.20
.826	.452 4360	1181	83 13 06.32	24.36	.876	.458 1730	1124	83 59 54.10	24.18
.827	.452 5540	1180	83 13 30.76	24.33	.877	.458 2813	1123	83 59 12.57	24.15
.828	.452 6719	1178	83 13 55.08	24.31	.878	.458 3894	1121	83 59 40.81	24.13
.829	.452 7897	1177	83 14 19.38	24.29	.879	.458 4973	1120	83 59 04.93	24.11
2.830	1.452 9073	1176	83 14 43.65	24.26	2.880	1.458 6045	1119	83 59 27.03	24.08
.831	.453 0249	1175	83 15 07.90	24.24	.881	.458 7101	1118	83 59 50.10	24.06
.832	.453 1424	1174	83 15 32.13	24.21	.882	.458 8151	1117	83 59 13.15	24.04
.833	.453 2597	1173	83 15 56.32	24.19	.883	.458 9198	1116	83 59 36.18	24.02
.834	.453 3769	1171	83 16 20.50	24.16	.884	.459 0243	1115	83 59 59.18	24.00
2.835	1.453 4940	1170	83 16 44.65	24.14	2.885	1.459 1287	1114	83 59 22.16	23.97
.836	.453 6109	1169	83 17 08.78	24.12	.886	.459 2330	1113	83 59 45.13	23.95
.837	.453 7278	1168	83 17 32.88	24.09	.887	.459 3373	1111	83 59 68.00	23.93
.838	.453 8445	1167	83 17 56.96	24.07	.888	.459 4413	1110	83 59 30.97	23.90
.839	.453 9612	1166	83 18 21.02	24.04	.889	.459 5453	1109	83 59 53.84	23.88
2.840	1.454 0777	1165	83 18 45.05	24.02	2.890	1.459 6481	1108	83 59 16.73	23.86
.841	.454 1941	1163	83 19 09.06	24.00	.891	.459 7509	1107	83 59 39.57	23.84
.842	.454 3104	1162	83 19 33.04	23.97	.892	.459 8536	1106	83 59 62.40	23.81
.843	.454 4265	1161	83 19 57.01	23.95	.893	.459 9561	1105	83 59 25.19	23.79
.844	.454 5426	1160	83 20 20.94	23.93	.894	.459 1005	1104	83 59 47.97	23.77
2.845	1.454 6585	1159	83 20 44.85	23.90	2.895	1.460 3108	1103	83 59 10.73	23.74
.846	.454 7743	1158	83 21 08.74	23.88	.896	.460 4110	1101	83 59 33.49	23.72
.847	.454 8900	1156	83 21 32.61	23.85	.897	.460 5111	1100	83 59 56.17	23.70
.848	.455 0056	1155	83 21 56.45	23.83	.898	.460 6111	1099	83 59 18.85	23.68
.849	.455 1211	1154	83 22 20.27	23.81	.899	.460 7110	1098	83 59 41.52	23.65
2.850	1.455 2365	1153	83 22 44.07	23.78	2.900	1.460 8607	1097	83 59 04.16	23.63
u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	sec u	$2 \tan^{-1}(e^u) - 90^\circ$	sec u	u	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	sec u	$2 \tan^{-1}(e^u) - 90^\circ$	sec u

The Gudermannian.

$u$	$\operatorname{gd} u$	$\omega F_u$	$\operatorname{gd} u$	$\omega F_u$	$u$	$\operatorname{gd} u$	$\omega F_u$	$\operatorname{gd} u$	$\omega F_u$
2.900	1.460 3907	1007	83 42 04.16	22.63	2.950	1.466 2123	1044	84 00 28.00	21.53
.001	.460 01.04	1008	83 42 25.73	22.61	.951	.466 3167	1043	84 00 49.53	21.51
.002	.460 02.00	1009	83 42 49.37	22.59	.952	.466 4209	1042	84 01 11.03	21.49
.003	.460 03.14	1011	83 43 11.95	22.56	.953	.466 5251	1041	84 01 32.51	21.47
.004	.460 03.87	1013	83 43 34.50	22.54	.954	.466 6291	1040	84 01 53.97	21.45
.005	1.461 04.60	1015	83 43 57.03	22.52	2.955	1.466 7330	1030	84 02 15.40	21.43
.006	.461 05.71	1016	83 44 19.54	22.50	.956	.466 8368	1038	84 02 36.82	21.40
.007	.461 06.50	1018	83 44 42.02	22.47	.957	.466 9406	1037	84 02 58.21	21.38
.008	.461 07.50	1020	83 45 04.48	22.45	.958	.467 0442	1036	84 03 19.58	21.36
.009	.461 08.15	1022	83 45 26.92	22.43	.959	.467 1477	1035	84 03 40.93	21.34
2.910	1.461 08.35	1025	83 45 49.34	22.41	2.960	1.467 2511	1034	84 04 02.27	21.32
.011	.461 09.10	1026	83 46 11.73	22.38	.961	.467 3544	1033	84 04 23.57	21.30
.012	.461 10.03	1028	83 46 34.14	22.36	.962	.467 4576	1032	84 04 44.86	21.28
.013	.461 11.00	1030	83 46 56.49	22.34	.963	.467 5607	1031	84 05 06.13	21.26
.014	.461 11.81	1032	83 47 18.79	22.32	.964	.467 6637	1029	84 05 27.37	21.23
2.915	1.461 12.43	1034	83 47 41.00	22.30	2.965	1.467 7666	1028	84 05 48.60	21.21
.016	.461 13.04	1036	83 48 03.38	22.27	.966	.467 8694	1027	84 06 09.80	21.19
.017	.461 13.84	1038	83 48 25.64	22.25	.967	.467 9721	1026	84 06 30.98	21.17
.018	.461 14.60	1040	83 48 47.88	22.23	.968	.468 0747	1025	84 06 52.14	21.15
.019	.461 15.32	1042	83 49 10.10	22.21	.969	.468 1772	1024	84 07 13.29	21.13
2.920	1.461 15.34	1045	83 49 32.39	22.18	2.970	1.468 2796	1023	84 07 34.40	21.11
.021	.461 16.00	1047	83 49 54.47	22.16	.971	.468 3819	1022	84 07 55.50	21.09
.022	.461 16.84	1049	83 50 16.63	22.14	.972	.468 4841	1021	84 08 16.58	21.07
.023	.461 17.53	1051	83 50 38.75	22.12	.973	.468 5861	1020	84 08 37.64	21.05
.024	.461 18.27	1053	83 51 00.86	22.10	.974	.468 6881	1019	84 08 58.67	21.02
2.925	1.461 18.83	1056	83 51 22.94	22.07	2.975	1.468 7900	1018	84 09 19.69	21.00
.026	.461 19.43	1058	83 51 45.00	22.05	.976	.468 8918	1017	84 09 40.68	20.98
.027	.461 20.10	1060	83 52 07.05	22.03	.977	.468 9935	1016	84 10 01.65	20.96
.028	.461 20.84	1062	83 52 29.07	22.01	.978	.469 0950	1015	84 10 22.60	20.94
.029	.461 21.60	1065	83 52 51.00	21.99	.979	.469 1965	1014	84 10 43.53	20.92
2.930	1.461 21.36	1068	83 53 13.04	21.97	2.980	1.469 2979	1013	84 11 04.44	20.90
.031	.461 22.02	1071	83 53 34.99	21.94	.981	.469 3992	1012	84 11 25.33	20.88
.032	.461 22.83	1073	83 53 56.93	21.92	.982	.469 5003	1011	84 11 46.20	20.86
.033	.461 23.60	1076	83 54 18.84	21.90	.983	.469 6014	1010	84 12 07.05	20.84
.034	.461 24.37	1078	83 54 40.73	21.88	.984	.469 7024	1009	84 12 27.83	20.82
2.935	1.461 24.12	1081	83 55 02.59	21.86	2.985	1.469 8033	1008	84 12 48.68	20.80
.036	.461 24.86	1084	83 55 24.44	21.83	.986	.469 9040	1007	84 13 09.47	20.78
.037	.461 25.64	1086	83 55 46.26	21.81	.987	.470 0047	1006	84 13 30.23	20.75
.038	.461 26.41	1089	83 56 08.07	21.79	.988	.470 1053	1005	84 13 50.98	20.73
.039	.461 27.27	1092	83 56 29.85	21.77	.989	.470 2057	1004	84 14 11.70	20.71
2.940	1.461 27.03	1095	83 56 51.60	21.75	2.990	1.470 3061	1003	84 14 32.40	20.69
.041	.461 27.89	1098	83 57 13.34	21.73	.991	.470 4064	1002	84 14 53.09	20.67
.042	.461 28.69	1101	83 57 35.00	21.70	.992	.470 5065	1001	84 15 13.75	20.65
.043	.461 29.50	1104	83 57 56.75	21.68	.993	.470 6066	1000	84 15 34.39	20.63
.044	.461 30.31	1107	83 58 18.42	21.66	.994	.470 7066	999	84 15 55.01	20.61
2.945	1.461 30.01	1110	83 58 40.07	21.64	2.995	1.470 8065	998	84 16 15.61	20.59
.046	.461 30.89	1113	83 59 01.70	21.62	.996	.470 9062	997	84 16 36.19	20.57
.047	.461 31.82	1116	83 59 23.31	21.60	.997	.471 0059	996	84 16 56.75	20.55
.048	.461 32.63	1119	83 59 44.90	21.58	.998	.471 1055	995	84 17 17.29	20.53
.049	.461 33.49	1122	83 60 06.46	21.55	.999	.471 2050	994	84 17 37.81	20.51
2.950	1.461 33.23	1125	84 00 28.00	21.53	3.000	1.471 3043	993	84 17 58.30	20.49
$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 00^\circ$	$\omega \operatorname{sech} u$	$u$	$2 \tan^{-1}(e^u) - \frac{\pi}{2}$	$\omega \operatorname{sech} u$	$2 \tan^{-1}(e^u) - 00^\circ$	$\omega \operatorname{sech} u$

The Gudermannian.

u	gd u	sinh u	gd u	cosh u	u	gd u	sinh u	gd u	cosh u
3.00	1.471 30.43	9033	81 17 58.30	201.88	3.50	1.510 4100	6034	86 32 26.47	134.46
.01	.473 29.27	9335	81 21 22.17	202.85	.51	.511 6203	5924	86 34 30.31	134.43
.02	.473 27.13	9737	81 24 44.04	203.81	.52	.511 6147	5915	86 36 34.02	134.00
.03	.474 24.01	9611	81 28 04.86	203.85	.53	.512 3043	5856	86 38 34.31	130.79
.04	.475 19.91	9515	81 31 31.72	206.83	.54	.512 7850	5798	86 40 34.50	119.59
3.05	1.476 1.912	9151	81 34 37.64	104.03	3.55	1.513 36.33	5740	86 42 33.49	118.40
.06	.477 08.96	9357	81 37 51.59	104.00	.56	.513 6440	5683	86 44 31.30	117.53
.07	.478 03.06	9304	81 41 03.64	101.00	.57	.514 4005	5627	86 46 27.04	116.06
.08	.478 01.25	9174	81 44 13.78	100.30	.58	.515 0504	5571	86 48 23.53	114.01
.09	.479 85.51	9083	81 47 22.04	107.34	.59	.515 6137	5516	86 50 17.76	113.60
3.10	1.480 75.88	8602	81 50 28.43	105.47	3.60	1.516 16.15	5461	86 52 10.96	112.63
.11	.481 65.35	9003	81 53 32.02	104.64	.61	.516 7058	5406	86 54 04.03	111.59
.12	.483 53.93	8814	81 56 35.60	101.81	.62	.517 2438	5353	86 55 54.00	110.41
.13	.483 41.61	8727	81 59 36.59	100.00	.63	.517 7704	5300	86 57 43.85	109.41
.14	.484 28.47	8640	85 02 35.70	108.22	.64	.518 3037	5247	86 59 34.62	108.22
3.15	1.485 1.415	8555	85 05 33.04	126.45	3.65	1.518 8.58	5195	87 01 20.30	107.45
.16	.485 09.57	8470	85 08 28.61	124.70	.66	.519 34.57	5143	87 03 06.00	106.43
.17	.486 8.385	8386	85 11 22.45	122.97	.67	.519 85.14	5092	87 04 54.47	105.03
.18	.487 67.30	8303	85 14 14.56	121.26	.68	.520 3611	5041	87 06 36.03	103.99
.19	.488 49.01	8221	85 17 04.92	109.86	.69	.520 86.57	4991	87 08 20.45	103.02
3.20	1.489 31.70	8139	85 19 53.60	167.88	3.70	1.521 3803	4942	87 10 04.80	101.93
.21	.490 1.509	8058	85 22 40.74	100.21	.71	.521 85.11	4893	87 11 44.31	100.92
.22	.490 93.87	7978	85 25 36.13	164.56	.72	.522 3.79	4844	87 13 24.73	99.91
.23	.491 73.36	7899	85 28 06.86	162.93	.73	.522 8109	4795	87 15 04.14	98.92
.24	.492 50.85	7821	85 30 51.00	161.32	.74	.523 2971	4748	87 16 44.57	97.94
3.25	1.493 28.67	7743	85 33 33.50	159.71	3.75	1.523 76.05	4701	87 18 26.02	96.96
.26	.494 07.72	7667	85 36 14.42	158.13	.76	.524 2424	4654	87 19 56.50	95.98
.27	.494 8.500	7590	85 38 43.77	156.56	.77	.524 7004	4608	87 21 34.03	94.95
.28	.495 57.53	7515	85 41 21.55	155.01	.78	.525 1686	4562	87 23 06.60	93.91
.29	.496 34.31	7441	85 43 58.79	153.47	.79	.525 6138	4517	87 24 40.23	92.92
3.30	1.497 06.31	7367	85 46 31.50	151.95	3.80	1.526 66.03	4473	87 26 12.03	91.91
.31	.497 79.64	7291	85 49 02.60	150.44	.81	.526 5075	4428	87 27 44.71	91.34
.32	.498 53.31	7224	85 51 32.33	148.95	.82	.526 9123	4384	87 29 15.93	90.34
.33	.499 24.07	7150	85 54 00.59	147.47	.83	.527 3830	4340	87 30 46.55	89.34
.34	.499 98.21	7079	85 56 27.32	146.00	.84	.527 8457	4297	87 32 14.00	88.34
3.35	1.500 65.61	7008	85 58 52.60	144.56	3.85	1.528 2.133	4254	87 33 42.80	87.35
.36	.501 35.37	6939	85 01 16.44	143.12	.86	.528 6046	4212	87 35 10.11	86.37
.37	.502 04.11	6870	85 03 38.81	141.70	.87	.529 6856	4170	87 36 36.55	85.01
.38	.503 7.77	6801	85 05 59.81	140.29	.88	.529 5005	4128	87 38 02.13	83.15
.39	.503 40.15	6734	85 08 19.44	138.90	.89	.529 9113	4087	87 39 26.86	81.31
3.40	1.504 07.46	6667	85 10 37.68	137.53	3.90	1.530 31.60	4047	87 40 50.75	80.47
.41	.504 73.80	6601	85 12 54.48	136.16	.91	.530 7297	4007	87 42 13.81	79.64
.42	.505 39.18	6536	85 15 09.96	134.80	.92	.531 1103	3967	87 43 36.01	78.81
.43	.506 04.51	6471	85 17 24.10	133.47	.93	.531 5140	3927	87 44 52.45	77.90
.44	.506 68.89	6406	85 19 36.90	132.14	.94	.531 9048	3888	87 46 18.05	76.90
3.45	1.507 34.64	6343	85 21 48.38	130.83	3.95	1.532 2917	3850	87 47 32.85	75.90
.46	.507 98.75	6280	85 23 58.56	129.53	.96	.532 6247	3811	87 48 56.36	74.91
.47	.508 53.33	6217	85 25 07.44	128.24	.97	.533 05.90	3773	87 50 18.67	73.93
.48	.509 20.10	6156	85 28 15.05	126.97	.98	.533 4.93	3736	87 51 34.54	72.96
.49	.509 81.35	6095	85 30 21.39	125.71	.99	.533 8911	3699	87 52 49.19	71.99
3.50	1.510 4100	6034	86 32 26.47	124.46	4.00	1.534 1691	3662	87 54 03.10	71.03
u	$2 \tan^{-1}(\sinh u) = \frac{\pi}{2}$	sinh u	$2 \tan^{-1}(\cosh u) - 90^\circ$	cosh u	u	$2 \tan^{-1}(\sinh u) = \frac{\pi}{2}$	sinh u	$2 \tan^{-1}(\cosh u) - 90^\circ$	cosh u

The Gudermannian.

u	gd u	ωF <sub>2</sub>	gd u	ωF <sub>2</sub>	u	gd u	ωF <sub>2</sub>	gd u	ωF <sub>2</sub>
4.00	1.534 1601	3063	87 54 05.10	75.53	4.50	1.548 5793	2222	88 43 37.40	45.82
.01	1.534 5335	3020	87 55 30.35	74.73	.51	1.548 8003	2199	88 44 22.99	45.37
.02	1.534 8913	3590	87 56 34.67	74.01	.52	1.549 0191	2178	88 45 08.13	44.92
.03	1.535 2311	3554	87 57 48.33	73.30	.53	1.549 2358	2156	88 45 52.82	44.47
.04	1.535 6020	3513	87 59 01.27	72.57	.54	1.549 4503	2134	88 46 37.07	44.03
4.05	1.535 9351	3473	88 00 13.48	71.85	4.55	1.549 6627	2113	88 47 20.88	43.59
.06	1.536 3047	3440	88 01 24.92	71.14	.56	1.549 8730	2092	88 48 04.25	43.15
.07	1.536 6119	3405	88 02 35.76	70.43	.57	1.550 0811	2071	88 48 47.19	42.73
.08	1.536 9340	3381	88 03 45.84	69.73	.58	1.550 2873	2051	88 49 29.70	42.30
.09	1.537 2810	3347	88 04 55.32	69.03	.59	1.550 4913	2030	88 50 11.79	41.88
4.10	1.537 6540	3314	88 06 03.91	68.35	4.60	1.550 6933	2010	88 50 53.46	41.46
.11	1.537 9837	3281	88 07 11.91	67.67	.61	1.550 8933	1990	88 51 34.72	41.05
.12	1.538 3103	3248	88 08 19.25	67.00	.62	1.551 0914	1970	88 52 15.56	40.64
.13	1.538 6333	3216	88 09 25.91	66.33	.63	1.551 2874	1951	88 52 56.00	40.24
.14	1.538 9533	3184	88 10 31.91	65.67	.64	1.551 4815	1931	88 53 36.04	39.84
4.15	1.539 3204	3152	88 11 37.25	65.02	4.65	1.551 6737	1912	88 54 15.68	39.44
.16	1.539 6347	3121	88 12 41.94	64.37	.66	1.551 8640	1893	88 54 54.92	39.05
.17	1.539 9443	3090	88 13 45.99	63.73	.67	1.552 0533	1874	88 55 33.77	38.66
.18	1.540 2494	3059	88 14 49.40	63.10	.68	1.552 2408	1856	88 56 12.24	38.28
.19	1.540 5501	3029	88 15 52.19	62.47	.69	1.552 4235	1837	88 56 50.33	37.89
4.20	1.540 8474	2998	88 16 54.34	61.85	4.70	1.552 6063	1819	88 57 28.03	37.52
.21	1.541 1428	2969	88 17 55.33	61.23	.71	1.552 7873	1801	88 58 05.36	37.14
.22	1.541 4354	2940	88 18 56.81	60.62	.72	1.552 9664	1783	88 58 43.32	36.77
.23	1.541 7246	2910	88 19 57.13	60.02	.73	1.553 1438	1765	88 59 18.91	36.41
.24	1.542 0111	2881	88 20 56.85	59.42	.74	1.553 3195	1748	88 59 55.14	36.05
4.25	1.542 2948	2852	88 21 55.93	58.83	4.75	1.553 4934	1730	89 00 31.01	35.69
.26	1.542 5760	2824	88 22 54.53	58.25	.76	1.553 6655	1713	89 01 06.52	35.33
.27	1.542 8540	2796	88 23 52.33	57.67	.77	1.553 8360	1696	89 01 41.68	34.98
.28	1.543 1288	2768	88 24 49.36	57.09	.78	1.554 0047	1679	89 02 16.48	34.63
.29	1.543 4005	2741	88 25 46.07	56.53	.79	1.554 1718	1662	89 02 50.94	34.29
4.30	1.543 6690	2713	88 26 43.01	55.96	4.80	1.554 3372	1646	89 03 25.05	33.95
.31	1.543 9344	2686	88 27 38.60	55.41	.81	1.554 5010	1630	89 03 58.84	33.61
.32	1.544 1971	2660	88 28 33.73	54.86	.82	1.554 6631	1613	89 04 32.28	33.28
.33	1.544 4574	2634	88 29 28.31	54.31	.83	1.554 8236	1597	89 05 05.30	32.94
.34	1.544 7147	2607	88 30 22.35	53.77	.84	1.554 9825	1581	89 05 38.17	32.62
4.35	1.544 9811	2581	88 31 15.83	53.24	4.85	1.555 1399	1566	89 06 10.63	32.29
.36	1.545 2409	2555	88 32 08.82	52.71	.86	1.555 2957	1550	89 06 42.76	31.97
.37	1.545 4982	2530	88 33 01.27	52.18	.87	1.555 4499	1535	89 07 14.57	31.65
.38	1.545 7530	2505	88 33 53.19	51.66	.88	1.555 6026	1519	89 07 46.07	31.34
.39	1.546 0054	2480	88 34 44.59	51.15	.89	1.555 7538	1504	89 08 17.25	31.03
4.40	1.546 2559	2455	88 35 35.49	50.64	4.90	1.555 9034	1489	89 08 48.12	30.72
.41	1.546 5043	2431	88 36 25.88	50.14	.91	1.556 0516	1474	89 09 18.69	30.41
.42	1.546 7500	2407	88 37 15.79	49.64	.92	1.556 1983	1460	89 09 48.95	30.11
.43	1.546 9935	2384	88 38 05.15	49.14	.93	1.556 3436	1445	89 10 18.91	29.81
.44	1.547 2355	2360	88 38 54.05	48.65	.94	1.556 4874	1431	89 10 48.57	29.51
4.45	1.547 4754	2335	88 39 42.46	48.17	4.95	1.556 6297	1417	89 11 17.93	29.22
.46	1.547 7129	2311	88 40 30.40	47.69	.96	1.556 7707	1403	89 11 47.01	28.93
.47	1.547 9477	2287	88 41 17.85	47.23	.97	1.556 9103	1389	89 12 15.79	28.64
.48	1.548 1805	2266	88 42 04.83	46.75	.98	1.557 0484	1375	89 12 44.29	28.36
.49	1.548 4100	2244	88 42 51.35	46.28	.99	1.557 1852	1361	89 13 12.51	28.07
4.50	1.548 5793	2222	88 43 37.40	45.82	5.00	1.557 3206	1348	89 13 40.44	27.79
u	2 tan <sup>-1</sup> (u) $\frac{\pi}{2}$	ω sech u	2 tan <sup>-1</sup> (e <sup>u</sup> ) - 90°	ω sech u	u	2 tan <sup>-1</sup> (u) $\frac{\pi}{2}$	ω sech u	2 tan <sup>-1</sup> (e <sup>u</sup> ) - 90°	ω sech u

The Gndermannian.

$u$	$gd\ u$	$\sec u$	$gd\ u$	$\sec u$	$u$	$gd\ u$	$\sec u$	$gd\ u$	$\sec u$
5.00	1.557 3206	13.08	89 13 40.44	27.79	5.50	1.562 6228	817	89 31 54.10	16.19
.01	.557 4547	13.31	89 14 08.10	27.52	.51	.562 7042	829	89 32 10.82	16.09
.02	.557 5875	13.41	89 14 35.48	27.24	.52	.562 7847	841	89 32 27.43	15.93
.03	.557 7180	13.68	89 15 02.58	26.97	.53	.562 8644	793	89 32 43.93	16.36
.04	.557 8461	13.95	89 15 29.42	26.71	.54	.562 9433	783	89 33 00.20	16.20
5.05	1.557 9778	1282	89 15 56.00	26.44	5.55	1.563 0215	777	89 33 16.32	16.04
.06	.558 1054	1260	89 16 22.30	26.18	.56	.563 0983	770	89 33 32.27	15.88
.07	.558 2317	1259	89 16 48.35	25.92	.57	.563 1751	762	89 33 48.07	15.72
.08	.558 3567	1241	89 17 14.11	25.66	.58	.563 2512	755	89 34 03.71	15.56
.09	.558 4801	1232	89 17 39.67	25.40	.59	.563 3263	747	89 34 19.40	15.41
5.10	1.558 6030	1219	89 18 04.94	25.15	5.60	1.563 4006	740	89 34 34.53	15.25
.11	.558 7243	1207	89 18 29.97	24.90	.61	.563 4742	734	89 34 49.74	15.10
.12	.558 8441	1195	89 18 54.71	24.65	.62	.563 5471	728	89 35 04.73	14.95
.13	.558 9633	1183	89 19 19.27	24.41	.63	.563 6192	718	89 35 19.61	14.80
.14	.559 0811	1172	89 19 43.56	24.16	.64	.563 6906	711	89 35 34.34	14.66
5.15	1.559 1976	1160	89 20 07.60	23.92	5.65	1.563 7613	703	89 35 48.94	14.51
.16	.559 3131	1148	89 20 31.40	23.69	.65	.563 8313	697	89 36 03.39	14.37
.17	.559 4273	1137	89 20 54.97	23.45	.66	.563 9006	690	89 36 17.66	14.22
.18	.559 5404	1126	89 21 18.31	23.22	.67	.563 9692	683	89 36 31.81	14.08
.19	.559 6524	1114	89 21 41.41	22.99	.68	.563 0372	676	89 36 45.82	13.94
5.20	1.559 7633	1103	89 22 04.38	22.76	5.70	1.564 1041	669	89 36 59.79	13.80
.21	.559 8731	1092	89 22 26.92	22.53	.71	.564 1710	663	89 37 13.44	13.67
.22	.559 9818	1081	89 22 49.31	22.31	.72	.564 2379	656	89 37 27.03	13.53
.23	.560 0894	1071	89 23 11.53	22.08	.73	.564 3043	649	89 37 40.49	13.40
.24	.560 1959	1060	89 23 33.51	21.86	.74	.564 3703	643	89 37 53.82	13.26
5.25	1.560 3014	1049	89 23 55.26	21.65	5.75	1.564 4368	637	89 38 07.01	13.13
.26	.560 4058	1039	89 24 16.80	21.43	.76	.564 5021	630	89 38 20.08	13.00
.27	.560 5093	1029	89 24 38.13	21.22	.77	.564 5673	624	89 38 33.01	12.87
.28	.560 6116	1018	89 24 59.24	21.01	.78	.564 6324	618	89 38 45.82	12.74
.29	.560 7129	1008	89 25 20.11	20.80	.79	.564 6974	612	89 38 58.50	12.61
5.30	1.560 8132	998	89 25 40.81	20.59	5.80	1.564 7624	606	89 39 11.05	12.49
.31	.560 9129	988	89 26 01.31	20.39	.81	.564 8272	599	89 39 23.48	12.37
.32	.561 0109	979	89 26 21.61	20.18	.82	.564 8919	593	89 39 35.78	12.24
.33	.561 1083	970	89 26 41.60	19.98	.83	.564 9564	584	89 39 47.96	12.12
.34	.561 2047	959	89 27 01.31	19.78	.84	.564 9707	578	89 40 00.02	12.00
5.35	1.561 3001	950	89 27 21.26	19.59	5.85	1.565 0355	576	89 40 11.66	11.88
.36	.561 3946	940	89 27 40.75	19.40	.86	.565 0999	570	89 40 23.21	11.76
.37	.561 4881	931	89 28 00.05	19.20	.87	.565 1640	565	89 40 34.48	11.65
.38	.561 5807	922	89 28 19.15	19.01	.88	.565 2278	559	89 40 45.67	11.53
.39	.561 6724	912	89 28 38.06	18.83	.89	.565 2914	553	89 40 56.54	11.41
5.40	1.561 7632	903	89 28 56.79	18.63	5.90	1.565 3548	548	89 41 07.00	11.30
.41	.561 8531	891	89 29 15.33	18.45	.91	.565 4179	542	89 41 17.15	11.19
.42	.561 9411	885	89 29 33.68	18.26	.92	.565 4807	537	89 41 27.28	11.08
.43	.562 0283	877	89 29 51.85	18.08	.93	.565 5434	532	89 41 37.30	10.97
.44	.562 1174	868	89 30 09.85	17.90	.94	.565 6059	526	89 41 47.31	10.86
5.45	1.562 2038	859	89 30 27.66	17.72	5.95	1.565 6682	521	89 42 05.02	10.75
.46	.562 2893	851	89 30 45.29	17.55	.96	.565 7303	516	89 42 15.71	10.64
.47	.562 3739	842	89 31 02.75	17.37	.97	.565 7920	511	89 42 26.30	10.53
.48	.562 4577	834	89 31 20.04	17.20	.98	.565 8535	506	89 42 36.79	10.43
.49	.562 5407	826	89 31 37.15	17.03	.99	.565 9147	501	89 42 47.17	10.33
5.50	1.562 6228	817	89 31 54.10	16.86	6.00	1.565 9758	496	89 42 57.44	10.23
$u$	$2 \tan^{-1}(\sec u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(\sec u) - 90^\circ$	$\sec u$	$u$	$2 \tan^{-1}(\sec u) - \frac{\pi}{2}$	$\sec u$	$2 \tan^{-1}(\sec u) - 90^\circ$	$\sec u$

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TABLE VII

THE ANTI-GUDERMANNIAN

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$m$  expressed in minutes in terms of the Gudermannian,

$gd\ u$  expressed in degrees and minutes,

1 minute  $\approx 0.000\ 2908\ 8821$  radians,

$$0.000\ 2908\ 8821\ m \approx \log_e \tan \left( \frac{1}{4} \cdot \pi + \frac{1}{2} gd\ u \right) \approx u \text{ radians.}$$

In this table the second decimal place is sometimes erroneous by a unit.

The Anti-Gndermmniam.

mi	0"	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	mi
0	0.00	10.00	120.02	180.08	240.19	300.38	360.66	421.05	481.57	542.23	603.07	0
1	1.00	61.00	121.12	181.68	241.20	301.38	361.66	422.05	482.58	543.25	604.08	1
2	2.00	62.00	122.13	182.68	242.20	302.39	362.67	423.06	483.59	544.26	605.10	2
3	3.00	63.00	123.13	183.69	243.20	303.39	363.67	424.07	484.60	545.27	606.12	3
4	4.00	64.00	124.13	184.69	244.20	304.40	364.68	425.08	485.61	546.28	607.13	4
5	5.00	65.00	125.03	185.69	245.21	305.40	365.69	426.09	486.62	547.29	608.15	5
6	6.00	66.00	126.03	186.69	246.21	306.40	366.69	427.09	487.63	548.31	609.16	6
7	7.00	67.00	127.13	187.69	247.21	307.41	367.70	428.10	488.64	549.32	610.18	7
8	8.00	68.00	128.13	188.69	248.21	308.41	368.70	429.11	489.65	550.34	611.19	8
9	9.00	69.00	129.03	189.69	249.22	309.42	369.71	430.12	490.66	551.35	612.21	9
10	10.00	70.00	130.03	190.10	250.22	310.42	370.72	431.13	491.67	552.36	613.23	10
11	11.00	71.00	131.03	191.10	251.22	311.43	371.72	432.13	492.68	553.37	614.24	11
12	12.00	72.00	132.03	192.10	252.23	312.43	372.73	433.14	493.69	554.39	615.26	12
13	13.00	73.00	133.03	193.10	253.23	313.43	373.73	434.15	494.70	555.40	616.27	13
14	14.00	74.00	134.03	194.10	254.23	314.44	374.74	435.16	495.71	556.41	617.29	14
15	15.00	75.00	135.03	195.10	255.23	315.44	375.75	436.17	496.72	557.43	618.31	15
16	16.00	76.00	136.03	196.11	256.24	316.45	376.75	437.17	497.73	558.44	619.32	16
17	17.00	77.00	137.04	197.11	257.24	317.45	377.76	438.18	498.74	559.45	620.34	17
18	18.00	78.00	138.04	198.11	258.24	318.45	378.76	439.19	499.75	560.47	621.36	18
19	19.00	79.00	139.04	199.11	259.25	319.46	379.77	440.20	500.76	561.48	622.37	19
20	20.00	80.00	140.04	200.11	260.25	320.46	380.78	441.21	501.77	562.49	623.39	20
21	21.00	81.00	141.04	201.11	261.25	321.47	381.78	442.21	502.78	563.51	624.40	21
22	22.00	82.00	142.04	202.12	262.25	322.47	382.79	443.22	503.79	564.52	625.42	22
23	23.00	83.00	143.04	203.12	263.26	323.48	383.79	444.22	504.80	565.53	626.44	23
24	24.00	84.00	144.04	204.12	264.26	324.48	384.80	445.23	505.81	566.55	627.45	24
25	25.00	85.00	145.04	205.12	265.26	325.48	385.81	446.23	506.82	567.56	628.47	25
26	26.00	86.00	146.04	206.12	266.27	326.49	386.81	447.24	507.83	568.57	629.49	26
27	27.00	87.00	147.04	207.12	267.27	327.49	387.82	448.24	508.84	569.59	630.50	27
28	28.00	88.00	148.05	208.13	268.27	328.50	388.83	449.25	509.85	570.60	631.52	28
29	29.00	89.00	149.05	209.13	269.27	329.50	389.83	450.25	510.86	571.62	632.53	29
30	30.00	90.00	150.05	210.13	270.28	330.51	390.84	451.26	511.87	572.63	633.55	30
31	31.00	91.00	151.05	211.13	271.28	331.51	391.85	452.26	512.88	573.64	634.57	31
32	32.00	92.00	152.05	212.13	272.28	332.52	392.85	453.27	513.89	574.65	635.59	32
33	33.00	93.00	153.05	213.14	273.29	333.52	393.86	454.27	514.90	575.67	636.60	33
34	34.00	94.00	154.05	214.14	274.29	334.53	394.86	455.28	515.91	576.68	637.62	34
35	35.00	95.00	155.05	215.14	275.29	335.53	395.87	456.28	516.92	577.69	638.64	35
36	36.00	96.00	156.05	216.14	276.30	336.54	396.88	457.29	517.93	578.71	639.65	36
37	37.00	97.00	157.05	217.14	277.30	337.54	397.88	458.29	518.94	579.72	640.67	37
38	38.00	98.00	158.05	218.15	278.30	338.55	398.89	459.30	519.95	580.73	641.69	38
39	39.00	99.00	159.05	219.15	279.31	339.55	399.90	460.30	520.96	581.74	642.71	39
40	40.00	100.00	160.06	220.15	280.31	340.56	400.91	461.31	521.97	582.75	643.73	40
41	41.00	101.00	161.06	221.15	281.31	341.56	401.91	462.31	522.98	583.76	644.75	41
42	42.00	102.00	162.06	222.15	282.32	342.57	402.92	463.32	523.99	584.77	645.77	42
43	43.00	103.00	163.06	223.16	283.32	343.57	403.93	464.32	525.00	585.78	646.79	43
44	44.00	104.00	164.06	224.16	284.32	344.58	404.93	465.33	526.01	586.79	647.81	44
45	45.00	105.00	165.06	225.16	285.33	345.58	405.94	466.34	527.02	587.80	648.83	45
46	46.00	106.00	166.06	226.16	286.33	346.59	406.95	467.34	528.03	588.81	649.85	46
47	47.00	107.00	167.07	227.16	287.33	347.59	407.95	468.35	529.04	589.82	650.87	47
48	48.00	108.00	168.07	228.17	288.34	348.60	408.96	469.35	530.05	590.83	651.89	48
49	49.00	109.00	169.07	229.17	289.34	349.60	409.97	470.36	531.06	591.84	652.91	49
50	50.00	110.00	170.07	230.17	290.34	350.61	410.97	471.37	532.07	592.85	653.93	50
51	51.00	111.00	171.07	231.17	291.35	351.61	411.98	472.38	533.08	593.86	654.95	51
52	52.00	112.00	172.07	232.18	292.35	352.62	412.99	473.39	534.09	594.87	655.97	52
53	53.00	113.00	173.07	233.18	293.35	353.62	413.99	474.40	535.10	595.88	656.99	53
54	54.00	114.00	174.07	234.18	294.36	354.63	415.00	475.41	536.11	596.89	658.01	54
55	55.00	115.00	175.07	235.18	295.36	355.63	416.01	476.42	537.12	597.90	659.03	55
56	56.00	116.00	176.08	236.18	296.37	356.64	417.02	477.43	538.13	598.91	660.05	56
57	57.00	117.00	177.08	237.19	297.37	357.64	418.03	478.44	539.14	599.92	661.07	57
58	58.00	118.00	178.08	238.19	298.37	358.65	419.04	479.45	540.15	600.93	662.09	58
59	59.00	119.00	179.08	239.19	299.38	359.65	420.04	480.46	541.16	601.94	663.11	59
60	60.00	120.00	180.08	240.19	300.38	360.66	421.05	481.47	542.17	602.95	664.13	60

The Anti-Gudermannian.

gd u	11"	12"	13"	14"	15"	16"	17"	18"	19"	20"	gd u
0'	664.00	745.32	780.28	818.49	910.46	972.73	1035.30	1098.22	1161.49	1225.14	0'
1	665.11	746.34	781.31	819.52	911.50	973.77	1036.35	1099.27	1162.54	1226.20	1
2	666.13	747.37	782.34	820.55	912.53	974.81	1037.40	1100.32	1163.60	1227.27	2
3	667.15	748.39	783.37	821.58	913.57	975.85	1038.44	1101.37	1164.66	1228.33	3
4	668.17	749.41	784.39	822.61	914.60	976.89	1039.49	1102.42	1165.72	1229.40	4
5	669.19	750.43	785.41	823.64	915.64	977.93	1040.53	1103.47	1166.78	1230.46	5
6	670.21	751.46	786.44	824.67	916.67	978.97	1041.58	1104.53	1167.83	1231.53	6
7	671.23	752.48	787.47	825.70	917.71	979.01	1042.63	1105.58	1168.89	1232.59	7
8	672.25	753.50	788.49	826.73	918.75	980.05	1043.67	1106.63	1169.95	1233.66	8
9	673.27	754.53	789.52	827.76	919.78	981.09	1044.72	1107.68	1171.01	1234.72	9
10	674.29	755.55	790.54	828.80	920.82	982.13	1045.77	1108.74	1172.07	1235.79	10
11	675.31	756.57	791.57	829.83	921.85	983.17	1046.81	1109.79	1173.13	1236.85	11
12	676.33	757.59	792.59	830.86	922.89	984.22	1047.85	1110.84	1174.19	1237.92	12
13	677.35	758.62	793.62	831.89	923.93	985.26	1048.91	1111.89	1175.24	1238.98	13
14	678.37	759.64	794.64	832.92	924.96	986.30	1049.95	1112.95	1176.30	1240.05	14
15	679.39	760.66	795.67	833.95	925.99	987.34	1051.00	1114.00	1177.35	1241.11	15
16	680.41	761.69	796.69	834.98	927.03	988.38	1052.05	1115.05	1178.42	1242.18	16
17	681.43	762.71	797.72	836.02	928.07	989.42	1053.09	1116.11	1179.48	1243.25	17
18	682.45	763.73	798.75	837.05	929.11	990.47	1054.14	1117.16	1180.54	1244.31	18
19	683.47	764.76	799.77	838.08	930.15	991.51	1055.19	1118.21	1181.60	1245.38	19
20	684.49	765.78	800.80	839.11	931.18	992.55	1056.24	1119.27	1182.66	1246.44	20
21	685.51	766.81	801.83	840.14	932.22	993.59	1057.28	1120.32	1183.72	1247.51	21
22	686.53	767.83	802.86	841.18	933.26	994.63	1058.33	1121.37	1184.78	1248.58	22
23	687.55	768.86	803.89	842.21	934.29	995.68	1059.38	1122.43	1185.84	1249.64	23
24	688.57	769.88	804.92	843.24	935.33	996.72	1060.43	1123.48	1186.90	1250.71	24
25	689.59	770.90	805.95	844.27	936.37	997.76	1061.48	1124.53	1187.96	1251.78	25
26	690.61	771.93	806.98	845.31	937.40	998.80	1062.52	1125.59	1189.02	1252.85	26
27	691.63	772.95	808.01	846.34	938.44	999.85	1063.57	1126.64	1190.08	1253.91	27
28	692.65	773.97	809.04	847.37	939.48	1000.89	1064.62	1127.70	1191.14	1254.98	28
29	693.67	775.00	810.07	848.40	940.52	1001.93	1065.67	1128.75	1192.20	1256.05	29
30	694.69	776.02	811.10	849.44	941.56	1002.97	1066.72	1129.81	1193.25	1257.12	30
31	695.71	777.05	812.13	850.47	942.59	1004.01	1067.77	1130.86	1194.32	1258.18	31
32	696.73	778.07	813.16	851.50	943.63	1005.06	1068.81	1131.92	1195.39	1259.25	32
33	697.75	779.10	814.19	852.54	944.67	1006.10	1069.86	1132.97	1196.45	1260.32	33
34	698.77	780.12	815.21	853.57	945.71	1007.15	1070.91	1134.03	1197.51	1261.39	34
35	699.79	781.14	816.24	854.60	946.74	1008.19	1071.96	1135.08	1198.57	1262.45	35
36	700.81	782.17	817.27	855.64	947.78	1009.23	1073.01	1136.14	1199.63	1263.52	36
37	701.83	783.19	818.30	856.67	948.82	1010.28	1074.06	1137.19	1200.69	1264.59	37
38	702.85	784.22	819.33	857.70	949.85	1011.32	1075.11	1138.25	1201.75	1265.66	38
39	703.87	785.24	820.36	858.74	950.89	1012.36	1076.16	1139.30	1202.82	1266.73	39
40	704.89	786.27	821.39	859.77	951.94	1013.41	1077.21	1140.36	1203.88	1267.80	40
41	705.91	787.29	822.42	860.80	952.98	1014.45	1078.26	1141.41	1204.94	1268.87	41
42	706.93	788.32	823.45	861.84	954.01	1015.50	1079.31	1142.47	1206.00	1269.93	42
43	707.95	789.34	824.48	862.87	955.05	1016.54	1080.36	1143.52	1207.06	1271.00	43
44	708.97	790.37	825.51	863.91	956.09	1017.58	1081.41	1144.58	1208.13	1272.07	44
45	709.99	791.39	826.54	864.94	957.13	1018.63	1082.46	1145.64	1209.19	1273.14	45
46	711.02	792.42	827.57	865.97	958.17	1019.67	1083.51	1146.69	1210.25	1274.21	46
47	712.04	793.44	828.60	867.01	959.21	1020.72	1084.56	1147.75	1211.31	1275.28	47
48	713.07	794.47	829.63	868.04	960.25	1021.76	1085.61	1148.80	1212.38	1276.35	48
49	714.09	795.50	830.66	869.08	961.29	1022.81	1086.66	1149.85	1213.44	1277.42	49
50	715.12	796.52	831.69	870.11	962.33	1023.85	1087.71	1150.92	1214.50	1278.49	50
51	716.14	797.55	832.72	871.14	963.37	1024.90	1088.76	1151.97	1215.57	1279.56	51
52	717.17	798.57	833.75	872.18	964.41	1025.94	1089.81	1153.03	1216.63	1280.63	52
53	718.19	799.60	834.78	873.21	965.45	1026.99	1090.86	1154.09	1217.69	1281.70	53
54	719.22	800.62	835.81	874.25	966.49	1028.03	1091.91	1155.14	1218.76	1282.77	54
55	720.24	801.65	836.84	875.28	967.53	1029.08	1092.96	1156.20	1219.82	1283.84	55
56	721.27	802.67	837.87	876.32	968.57	1030.12	1094.01	1157.26	1220.88	1284.91	56
57	722.29	803.70	838.90	877.35	969.61	1031.17	1095.06	1158.32	1221.95	1285.98	57
58	723.32	804.73	839.93	878.39	970.65	1032.21	1096.11	1159.37	1223.01	1287.05	58
59	724.34	805.75	840.96	879.43	971.69	1033.26	1097.16	1160.43	1224.07	1288.13	59
60	725.37	806.78	841.99	880.46	972.73	1034.30	1098.22	1161.49	1225.14	1289.20	60



The Anti-Gudermannian.

gd u	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	gd u
0'	1289.20	1353.69	1418.63	1484.06	1549.99	1616.47	1683.52	1751.16	1819.44	1888.38	0'
1	1290.27	1354.76	1419.72	1485.15	1551.10	1617.58	1684.64	1752.29	1820.58	1889.53	1
2	1291.34	1355.81	1420.80	1486.25	1552.20	1618.70	1685.76	1753.43	1821.72	1890.69	2
3	1292.41	1356.92	1421.89	1487.34	1553.31	1619.81	1686.88	1754.56	1822.87	1891.84	3
4	1293.48	1358.00	1422.98	1488.44	1554.41	1620.92	1688.01	1755.69	1824.01	1893.00	4
5	1294.55	1359.08	1424.05	1489.53	1555.51	1622.04	1689.13	1756.83	1825.16	1894.15	5
6	1295.63	1360.16	1425.15	1490.63	1556.62	1623.15	1690.25	1757.96	1826.30	1895.31	6
7	1296.70	1361.24	1426.24	1491.72	1557.72	1624.26	1691.38	1759.09	1827.44	1896.46	7
8	1297.77	1362.32	1427.32	1492.82	1558.83	1625.38	1692.50	1760.23	1828.59	1897.62	8
9	1298.84	1363.40	1428.41	1493.91	1559.93	1626.49	1693.62	1761.35	1829.73	1898.78	9
10	1299.91	1364.48	1429.50	1495.01	1561.04	1627.61	1694.75	1762.50	1830.88	1899.93	10
11	1300.99	1365.56	1430.59	1496.11	1562.14	1628.72	1695.87	1763.63	1832.02	1901.09	11
12	1302.06	1366.64	1431.68	1497.20	1563.25	1629.84	1697.00	1764.77	1833.17	1902.25	12
13	1303.13	1367.72	1432.76	1498.30	1564.35	1630.95	1698.12	1765.90	1834.32	1903.40	13
14	1304.20	1368.80	1433.85	1499.40	1565.46	1632.05	1699.25	1767.04	1835.46	1904.56	14
15	1305.28	1369.88	1434.94	1500.49	1566.56	1633.18	1700.37	1768.17	1836.61	1905.72	15
16	1306.35	1370.95	1436.03	1501.59	1567.67	1634.29	1701.50	1769.31	1837.75	1906.88	16
17	1307.42	1372.04	1437.12	1502.69	1568.77	1635.41	1702.62	1770.44	1838.90	1908.03	17
18	1308.50	1373.12	1438.21	1503.78	1569.88	1636.52	1703.75	1771.58	1840.05	1909.19	18
19	1309.57	1374.20	1439.29	1504.88	1570.99	1637.64	1704.87	1772.71	1841.19	1910.35	19
20	1310.64	1375.28	1440.38	1505.98	1572.09	1638.76	1705.99	1773.85	1842.34	1911.51	20
21	1311.72	1376.36	1441.47	1507.08	1573.20	1639.87	1707.12	1774.98	1843.49	1912.67	21
22	1312.79	1377.44	1442.56	1508.17	1574.31	1640.99	1708.25	1776.12	1844.64	1913.83	22
23	1313.86	1378.52	1443.65	1509.27	1575.41	1642.10	1709.37	1777.26	1845.78	1914.98	23
24	1314.94	1379.61	1444.74	1510.37	1576.52	1643.22	1710.50	1778.39	1846.93	1916.14	24
25	1316.01	1380.69	1445.83	1511.47	1577.63	1644.34	1711.63	1779.53	1848.08	1917.30	25
26	1317.08	1381.77	1446.92	1512.57	1578.73	1645.45	1712.75	1780.67	1849.23	1918.46	26
27	1318.16	1382.85	1448.01	1513.67	1579.84	1646.57	1713.88	1781.81	1850.37	1919.62	27
28	1319.23	1383.93	1449.10	1514.76	1580.95	1647.69	1715.01	1782.94	1851.52	1920.78	28
29	1320.31	1385.02	1450.19	1515.86	1582.06	1648.80	1716.14	1784.08	1852.67	1921.94	29
30	1321.38	1386.10	1451.28	1516.96	1583.17	1649.92	1717.26	1785.22	1853.82	1923.10	30
31	1322.45	1387.18	1452.37	1518.06	1584.27	1651.04	1718.39	1786.36	1854.97	1924.26	31
32	1323.53	1388.26	1453.46	1519.16	1585.38	1652.16	1719.52	1787.50	1856.12	1925.43	32
33	1324.60	1389.35	1454.55	1520.26	1586.49	1653.27	1720.65	1788.63	1857.27	1926.59	33
34	1325.68	1390.43	1455.64	1521.35	1587.60	1654.39	1721.77	1789.77	1858.42	1927.75	34
35	1326.75	1391.51	1456.73	1522.46	1588.71	1655.51	1722.90	1790.91	1859.57	1928.91	35
36	1327.83	1392.59	1457.83	1523.56	1589.82	1656.63	1724.03	1792.05	1860.72	1930.07	36
37	1328.90	1393.68	1458.92	1524.66	1590.93	1657.75	1725.16	1793.19	1861.87	1931.23	37
38	1329.98	1394.76	1460.01	1525.75	1592.03	1658.87	1726.29	1794.33	1863.02	1932.40	38
39	1331.06	1395.84	1461.10	1526.85	1593.14	1659.98	1727.42	1795.47	1864.17	1933.56	39
40	1332.13	1396.93	1462.19	1527.95	1594.25	1661.10	1728.54	1796.61	1865.32	1934.72	40
41	1333.21	1398.01	1463.28	1529.06	1595.36	1662.22	1729.67	1797.75	1866.47	1935.88	41
42	1334.29	1399.10	1464.38	1530.16	1596.47	1663.34	1730.80	1798.89	1867.62	1937.05	42
43	1335.37	1400.18	1465.47	1531.25	1597.58	1664.46	1731.93	1800.03	1868.77	1938.21	43
44	1336.44	1401.25	1466.56	1532.36	1598.69	1665.58	1733.05	1801.17	1869.92	1939.37	44
45	1337.52	1402.35	1467.65	1533.46	1599.80	1666.70	1734.19	1802.31	1871.08	1940.54	45
46	1338.60	1403.43	1468.75	1534.56	1600.91	1667.82	1735.32	1803.45	1872.23	1941.70	46
47	1339.67	1404.52	1469.84	1535.66	1602.02	1668.94	1736.45	1804.59	1873.38	1942.85	47
48	1340.75	1405.60	1470.93	1536.77	1603.13	1670.06	1737.58	1805.73	1874.53	1944.03	48
49	1341.83	1406.69	1472.02	1537.87	1604.24	1671.18	1738.71	1806.87	1875.69	1945.19	49
50	1342.91	1407.77	1473.12	1538.97	1605.35	1672.30	1739.84	1808.01	1876.84	1946.36	50
51	1343.98	1408.85	1474.21	1540.07	1606.46	1673.42	1740.98	1809.15	1877.99	1947.52	51
52	1345.06	1409.94	1475.30	1541.17	1607.58	1674.54	1742.11	1810.30	1879.14	1948.69	52
53	1346.14	1411.03	1476.40	1542.27	1608.69	1675.66	1743.24	1811.44	1880.30	1949.85	53
54	1347.22	1412.11	1477.49	1543.38	1609.80	1676.79	1744.37	1812.58	1881.45	1951.02	54
55	1348.29	1413.20	1478.59	1544.48	1610.91	1677.91	1745.50	1813.72	1882.60	1952.18	55
56	1349.37	1414.28	1479.68	1545.58	1612.02	1679.03	1746.63	1814.85	1883.75	1953.35	56
57	1350.45	1415.37	1480.77	1546.69	1613.13	1680.15	1747.76	1816.01	1884.91	1954.51	57
58	1351.53	1416.46	1481.87	1547.79	1614.25	1681.27	1748.90	1817.15	1886.07	1955.68	58
59	1352.61	1417.54	1482.96	1548.89	1615.36	1682.39	1750.03	1818.29	1887.22	1956.85	59
60	1353.69	1418.63	1484.06	1549.99	1616.47	1683.52	1751.16	1819.44	1888.38	1958.01	60

The Anti-Gudermannian.

ad n	31"	32"	33"	34"	35"	36"	37"	38"	39"	40"	ad n
1	1035.01	3033.38	3009.83	2171.48	2244.29	2317.99	2392.63	2468.26	2544.93	2622.69	0
2	1036.18	3039.36	3100.72	2173.69	2245.51	2319.22	2393.88	2469.53	2546.22	2624.00	1
3	1037.35	3045.34	3101.91	2173.89	2246.73	2320.45	2395.14	2470.80	2547.50	2625.30	2
4	1038.51	3051.32	3103.10	2175.10	2247.95	2321.70	2396.39	2472.07	2548.79	2626.61	3
5	1039.68	3057.30	3104.31	2176.31	2249.17	2322.93	2397.64	2473.34	2550.08	2627.91	4
6	1040.84	3063.28	3105.52	2177.51	2250.39	2324.17	2398.90	2474.61	2551.37	2629.22	5
7	1042.01	3069.26	3106.63	2178.72	2251.62	2325.41	2400.15	2475.88	2552.66	2630.53	6
8	1043.18	3075.24	3107.88	2179.93	2252.84	2326.65	2401.40	2477.15	2553.95	2631.84	7
9	1044.35	3081.22	3109.07	2181.14	2254.06	2327.89	2402.65	2478.42	2555.23	2633.14	8
10	1045.51	3087.20	3110.27	2182.35	2255.28	2329.12	2403.91	2479.69	2556.52	2634.45	9
11	1046.68	3093.18	3111.49	2183.55	2256.51	2330.36	2405.17	2480.97	2557.81	2635.76	10
12	1047.84	3100.16	3112.66	2184.76	2257.73	2331.60	2406.42	2482.21	2559.10	2637.07	11
13	1049.01	3106.14	3113.85	2185.97	2258.95	2332.84	2407.68	2483.51	2560.39	2638.38	12
14	1050.18	3112.12	3115.05	2187.18	2260.18	2334.08	2408.93	2484.78	2561.68	2639.69	13
15	1051.35	3118.10	3116.24	2188.39	2261.40	2335.32	2410.19	2486.05	2562.97	2641.00	14
16	1052.51	3124.08	3117.44	2189.60	2262.63	2336.56	2411.44	2487.33	2564.27	2642.31	15
17	1053.68	3130.06	3118.63	2190.81	2263.85	2337.80	2412.70	2488.60	2565.56	2643.62	16
18	1054.84	3136.04	3119.83	2192.02	2265.08	2339.04	2413.95	2489.83	2566.85	2644.93	17
19	1056.01	3142.02	3121.03	2193.23	2266.30	2340.28	2415.21	2491.15	2568.14	2646.24	18
20	1057.18	3148.00	3122.22	2194.44	2267.53	2341.52	2416.47	2492.43	2569.43	2647.55	19
21	1058.35	3153.98	3123.43	2195.65	2268.75	2342.75	2417.72	2493.70	2570.73	2648.85	20
22	1059.51	3160.10	3124.62	2196.85	2269.98	2344.00	2418.99	2494.97	2572.02	2650.17	21
23	1060.68	3166.18	3125.84	2198.07	2271.20	2345.25	2420.24	2496.25	2573.31	2651.49	22
24	1061.84	3172.16	3127.07	2199.29	2272.43	2346.49	2421.50	2497.52	2574.61	2652.80	23
25	1063.01	3178.14	3128.29	2200.50	2273.66	2347.73	2422.76	2498.80	2575.90	2654.11	24
26	1064.18	3184.12	3129.51	2201.71	2274.88	2348.97	2424.02	2500.08	2577.19	2655.43	25
27	1065.35	3190.10	3130.71	2202.92	2276.11	2350.21	2425.28	2501.35	2578.49	2656.74	26
28	1066.51	3196.08	3131.93	2204.14	2277.34	2351.45	2426.54	2502.63	2579.78	2658.05	27
29	1067.68	3202.06	3133.15	2205.35	2278.57	2352.70	2427.80	2503.91	2581.08	2659.37	28
30	1068.84	3208.04	3134.37	2206.56	2279.79	2353.95	2429.05	2505.18	2582.37	2660.68	29
31	1070.01	3214.02	3135.59	2207.78	2281.02	2355.19	2430.32	2506.46	2583.67	2662.00	30
32	1071.18	3220.00	3136.80	2208.99	2282.25	2356.43	2431.58	2507.74	2584.97	2663.31	31
33	1072.35	3226.00	3138.02	2210.21	2283.48	2357.68	2432.84	2509.02	2586.26	2664.63	32
34	1073.51	3232.00	3139.24	2211.42	2284.71	2358.92	2434.10	2510.30	2587.56	2665.94	33
35	1074.68	3238.00	3140.46	2212.63	2285.94	2360.17	2435.36	2511.58	2588.85	2667.25	34
36	1075.84	3244.00	3141.68	2213.84	2287.17	2361.41	2436.62	2512.86	2590.15	2668.58	35
37	1077.01	3250.00	3142.90	2215.06	2288.40	2362.65	2437.88	2514.14	2591.45	2669.89	36
38	1078.18	3256.00	3144.12	2216.27	2289.63	2363.90	2439.15	2515.41	2592.75	2671.21	37
39	1079.35	3262.00	3145.34	2217.49	2290.86	2365.15	2440.41	2516.69	2594.05	2672.53	38
40	1080.51	3268.00	3146.56	2218.70	2292.09	2366.40	2441.68	2517.97	2595.35	2673.85	39
41	1081.68	3274.00	3147.78	2219.92	2293.32	2367.64	2442.94	2519.25	2596.65	2675.16	40
42	1082.84	3280.00	3149.00	2221.14	2294.55	2368.89	2444.20	2520.54	2597.95	2676.48	41
43	1084.01	3286.00	3150.22	2222.35	2295.78	2370.13	2445.47	2521.82	2599.24	2677.80	42
44	1085.18	3292.00	3151.44	2223.57	2297.01	2371.38	2446.73	2523.10	2600.54	2679.12	43
45	1086.35	3298.00	3152.66	2224.79	2298.24	2372.61	2447.99	2524.38	2601.84	2680.44	44
46	1087.51	3304.00	3153.88	2226.00	2299.48	2373.88	2449.26	2525.66	2603.14	2681.76	45
47	1088.68	3310.00	3155.10	2227.22	2300.71	2375.13	2450.53	2526.95	2604.45	2683.08	46
48	1089.84	3316.00	3156.32	2228.44	2301.94	2376.38	2451.79	2528.23	2605.75	2684.40	47
49	1091.01	3322.00	3157.54	2229.66	2303.17	2377.63	2453.05	2529.51	2607.05	2685.72	48
50	1092.18	3328.00	3158.76	2230.88	2304.41	2378.87	2454.32	2530.79	2608.35	2687.04	49
51	1093.35	3334.00	3159.98	2232.09	2305.64	2380.12	2455.58	2532.08	2609.65	2688.36	50
52	1094.51	3340.00	3161.20	2233.31	2306.88	2381.37	2456.85	2533.36	2610.95	2689.69	51
53	1095.68	3346.00	3162.42	2234.53	2308.11	2382.62	2458.12	2534.65	2612.25	2691.01	52
54	1096.84	3352.00	3163.64	2235.75	2309.34	2383.87	2459.39	2535.93	2613.56	2692.33	53
55	1098.01	3358.00	3164.86	2236.97	2310.58	2385.12	2460.65	2537.22	2614.86	2693.65	54
56	1099.18	3364.00	3166.08	2238.19	2311.81	2386.37	2461.92	2538.50	2616.17	2694.98	55
57	1100.35	3370.00	3167.30	2239.41	2313.05	2387.62	2463.19	2539.79	2617.47	2696.30	56
58	1101.51	3376.00	3168.52	2240.63	2314.28	2388.88	2464.46	2541.07	2618.78	2697.63	57
59	1102.68	3382.00	3169.74	2241.85	2315.52	2390.13	2465.72	2542.36	2620.08	2698.95	58
60	1103.84	3388.00	3170.96	2243.07	2316.75	2391.38	2466.99	2543.64	2621.38	2700.27	59
61	1105.01	3394.00	3172.18	2244.29	2317.99	2392.63	2468.26	2544.93	2622.69	2701.60	60

The Anti-Gudermannian.

gd u	41"	42"	43"	44"	45"	46"	47"	48"	49"	50"	gd u
0	2701.60	2781.71	2861.80	2941.81	3021.91	3101.55	3182.21	3261.53	3342.08	3421.47	0
1	2702.02	2782.66	2862.46	2942.21	3022.35	3102.00	3182.48	3262.02	3342.61	3422.04	1
2	2702.45	2783.40	2863.33	2943.00	3023.27	3102.44	3183.05	3262.45	3343.14	3422.50	2
3	2702.87	2784.25	2864.20	2943.99	3024.18	3103.87	3183.72	3263.01	3343.60	3423.41	3
4	2703.30	2785.09	2865.57	2944.88	3025.00	3104.30	3184.38	3263.34	3344.02	3423.70	4
5	2703.73	2785.44	2866.94	2945.77	3025.77	3104.72	3184.75	3263.65	3344.41	3424.00	5
6	2704.15	2786.79	2867.31	2946.16	3026.13	3105.19	3185.12	3263.96	3344.84	3424.31	6
7	2704.58	2787.14	2867.68	2946.55	3026.50	3105.56	3185.49	3264.27	3345.27	3424.61	7
8	2705.01	2787.49	2868.05	2946.95	3026.87	3105.93	3185.86	3264.58	3345.68	3424.91	8
9	2705.44	2787.84	2868.42	2947.34	3027.24	3106.30	3186.23	3264.89	3346.09	3425.21	9
10	2705.87	2788.19	2868.79	2947.73	3027.61	3106.67	3186.60	3265.20	3346.50	3425.51	10
11	2706.30	2788.54	2869.16	2948.13	3027.98	3107.04	3186.97	3265.51	3346.91	3425.81	11
12	2706.73	2788.89	2869.53	2948.53	3028.35	3107.41	3187.34	3265.82	3347.32	3426.11	12
13	2707.16	2789.24	2869.90	2948.92	3028.72	3107.78	3187.71	3266.13	3347.73	3426.41	13
14	2707.59	2789.59	2870.27	2949.32	3029.09	3108.15	3188.08	3266.44	3348.14	3426.71	14
15	2708.02	2789.94	2870.64	2949.71	3029.46	3108.52	3188.45	3266.75	3348.55	3427.01	15
16	2708.45	2790.29	2871.01	2950.11	3029.83	3108.89	3188.82	3267.06	3348.96	3427.31	16
17	2708.88	2790.64	2871.38	2950.50	3030.20	3109.26	3189.19	3267.37	3349.37	3427.61	17
18	2709.31	2790.99	2871.75	2950.89	3030.57	3109.63	3189.56	3267.68	3349.78	3427.91	18
19	2709.74	2791.34	2872.12	2951.29	3030.94	3110.00	3189.93	3267.99	3350.19	3428.21	19
20	2710.17	2791.69	2872.49	2951.68	3031.31	3110.37	3190.30	3268.30	3350.60	3428.51	20
21	2710.60	2792.04	2872.86	2952.08	3031.68	3110.74	3190.67	3268.61	3351.01	3428.81	21
22	2711.03	2792.39	2873.23	2952.47	3032.05	3111.11	3191.04	3268.92	3351.42	3429.11	22
23	2711.46	2792.74	2873.60	2952.87	3032.42	3111.48	3191.41	3269.23	3351.83	3429.41	23
24	2711.89	2793.09	2873.97	2953.26	3032.79	3111.85	3191.78	3269.54	3352.24	3429.71	24
25	2712.32	2793.44	2874.34	2953.66	3033.16	3112.22	3192.15	3269.85	3352.65	3430.01	25
26	2712.75	2793.79	2874.71	2954.05	3033.53	3112.59	3192.52	3270.16	3353.06	3430.31	26
27	2713.18	2794.14	2875.08	2954.45	3033.90	3112.96	3192.89	3270.47	3353.47	3430.61	27
28	2713.61	2794.49	2875.45	2954.84	3034.27	3113.33	3193.26	3270.78	3353.88	3430.91	28
29	2714.04	2794.84	2875.82	2955.24	3034.64	3113.70	3193.63	3271.09	3354.29	3431.21	29
30	2714.47	2795.19	2876.19	2955.63	3035.01	3114.07	3194.00	3271.40	3354.70	3431.51	30
31	2714.90	2795.54	2876.56	2956.03	3035.38	3114.44	3194.37	3271.71	3355.11	3431.81	31
32	2715.33	2795.89	2876.93	2956.42	3035.75	3114.81	3194.74	3272.02	3355.52	3432.11	32
33	2715.76	2796.24	2877.30	2956.82	3036.12	3115.18	3195.11	3272.33	3355.93	3432.41	33
34	2716.19	2796.59	2877.67	2957.21	3036.49	3115.55	3195.48	3272.64	3356.34	3432.71	34
35	2716.62	2796.94	2878.04	2957.60	3036.86	3115.92	3195.85	3272.95	3356.75	3433.01	35
36	2717.05	2797.29	2878.41	2958.00	3037.23	3116.29	3196.22	3273.26	3357.16	3433.31	36
37	2717.48	2797.64	2878.78	2958.39	3037.60	3116.66	3196.59	3273.57	3357.57	3433.61	37
38	2717.91	2797.99	2879.15	2958.79	3037.97	3117.03	3196.96	3273.88	3357.98	3433.91	38
39	2718.34	2798.34	2879.52	2959.18	3038.34	3117.40	3197.33	3274.19	3358.39	3434.21	39
40	2718.77	2798.69	2879.89	2959.58	3038.71	3117.77	3197.70	3274.50	3358.80	3434.51	40
41	2719.20	2799.04	2880.26	2960.00	3039.08	3118.14	3198.07	3274.81	3359.21	3434.81	41
42	2719.63	2799.39	2880.63	2960.39	3039.45	3118.51	3198.44	3275.12	3359.62	3435.11	42
43	2720.06	2799.74	2881.00	2960.79	3039.82	3118.88	3198.81	3275.43	3360.03	3435.41	43
44	2720.49	2800.09	2881.37	2961.18	3040.19	3119.25	3199.18	3275.74	3360.44	3435.71	44
45	2720.92	2800.44	2881.74	2961.58	3040.56	3119.62	3199.55	3276.05	3360.85	3436.01	45
46	2721.35	2800.79	2882.11	2961.97	3040.93	3120.00	3200.00	3276.36	3361.26	3436.31	46
47	2721.78	2801.14	2882.48	2962.37	3041.30	3120.37	3200.37	3276.67	3361.67	3436.61	47
48	2722.21	2801.49	2882.85	2962.76	3041.67	3120.74	3200.74	3276.98	3362.08	3436.91	48
49	2722.64	2801.84	2883.22	2963.16	3042.04	3121.11	3201.11	3277.29	3362.49	3437.21	49
50	2723.07	2802.19	2883.59	2963.55	3042.41	3121.48	3201.48	3277.60	3362.90	3437.51	50
51	2723.50	2802.54	2883.96	2963.95	3042.78	3121.85	3201.85	3277.91	3363.31	3437.81	51
52	2723.93	2802.89	2884.33	2964.34	3043.15	3122.22	3202.22	3278.22	3363.72	3438.11	52
53	2724.36	2803.24	2884.70	2964.74	3043.52	3122.59	3202.59	3278.53	3364.13	3438.41	53
54	2724.79	2803.59	2885.07	2965.13	3043.89	3122.96	3202.96	3278.84	3364.54	3438.71	54
55	2725.22	2803.94	2885.44	2965.53	3044.26	3123.33	3203.33	3279.15	3364.95	3439.01	55
56	2725.65	2804.29	2885.81	2965.92	3044.63	3123.70	3203.70	3279.46	3365.36	3439.31	56
57	2726.08	2804.64	2886.18	2966.32	3045.00	3124.07	3204.07	3279.77	3365.77	3439.61	57
58	2726.51	2804.99	2886.55	2966.71	3045.37	3124.44	3204.44	3280.08	3366.18	3439.91	58
59	2726.94	2805.34	2886.92	2967.11	3045.74	3124.81	3204.81	3280.39	3366.59	3440.21	59
60	2727.37	2805.69	2887.29	2967.50	3046.11	3125.18	3205.18	3280.70	3367.00	3440.51	60

The Anti-Gudermannian.

gd u	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	gd u
0°	3568.81	3665.19	3763.76	3864.64	3967.97	4073.90	4182.62	4294.30	4409.14	4527.37	0°
1	3570.40	3666.82	3765.42	3866.34	3969.71	4075.69	4184.46	4296.19	4411.08	4529.37	1
2	3571.99	3668.44	3767.09	3868.04	3971.46	4077.48	4186.29	4298.07	4413.03	4531.37	2
3	3573.58	3670.07	3768.75	3869.71	3973.29	4079.27	4188.13	4299.96	4414.97	4533.37	3
4	3575.17	3671.70	3770.41	3871.45	3975.05	4081.05	4189.97	4301.85	4416.92	4535.38	4
5	3576.76	3673.32	3772.08	3873.15	3976.69	4082.86	4191.81	4303.74	4418.86	4537.38	5
6	3578.35	3674.95	3773.74	3874.86	3978.44	4084.65	4193.65	4305.64	4420.81	4539.39	6
7	3579.94	3676.58	3775.41	3876.56	3980.19	4086.44	4195.49	4307.53	4422.75	4541.39	7
8	3581.54	3678.21	3777.08	3878.27	3981.94	4088.24	4197.33	4309.42	4424.70	4543.40	8
9	3583.13	3679.84	3778.74	3879.98	3983.69	4090.03	4199.17	4311.32	4426.65	4545.41	9
10	3584.73	3681.47	3780.41	3881.68	3985.44	4091.83	4201.02	4313.21	4428.60	4547.42	10
11	3586.32	3683.10	3782.08	3883.39	3987.19	4093.62	4202.87	4315.11	4430.56	4549.43	11
12	3587.92	3684.73	3783.75	3885.10	3988.94	4095.42	4204.71	4317.01	4432.51	4551.44	12
13	3589.51	3686.36	3785.42	3886.81	3990.69	4097.22	4206.56	4318.91	4434.46	4553.45	13
14	3591.11	3687.99	3787.09	3888.52	3992.45	4099.02	4208.41	4320.80	4436.42	4555.47	14
15	3592.71	3689.63	3788.76	3890.23	3994.20	4100.82	4210.26	4322.70	4438.37	4557.48	15
16	3594.30	3691.26	3790.43	3891.95	3995.95	4102.62	4212.10	4324.61	4440.33	4559.50	16
17	3595.90	3692.90	3792.10	3893.66	3997.71	4104.42	4213.95	4326.51	4442.29	4561.52	17
18	3597.50	3694.53	3793.78	3895.37	3999.47	4106.22	4215.80	4328.41	4444.24	4563.53	18
19	3599.10	3696.17	3795.45	3897.09	4001.22	4108.02	4217.66	4330.31	4446.20	4565.55	19
20	3600.70	3697.80	3797.12	3898.80	4002.98	4109.82	4219.51	4332.22	4448.16	4567.57	20
21	3602.30	3699.44	3798.80	3900.52	4004.74	4111.63	4221.36	4334.12	4450.12	4569.59	21
22	3603.90	3701.08	3800.47	3902.23	4006.50	4113.44	4223.22	4336.03	4452.09	4571.61	22
23	3605.50	3702.71	3802.15	3903.95	4008.26	4115.24	4225.07	4337.94	4454.05	4573.64	23
24	3607.11	3704.35	3803.83	3905.67	4010.02	4117.05	4226.93	4339.81	4456.01	4575.65	24
25	3608.71	3705.99	3805.50	3907.38	4011.78	4118.85	4228.78	4341.75	4457.98	4577.69	25
26	3610.32	3707.63	3807.18	3909.10	4013.54	4120.66	4230.64	4343.66	4459.94	4579.71	26
27	3611.92	3709.27	3808.85	3910.82	4015.31	4122.47	4232.50	4345.57	4461.91	4581.74	27
28	3613.52	3710.91	3810.51	3912.54	4017.07	4124.28	4234.36	4347.48	4463.88	4583.77	28
29	3615.13	3712.56	3812.22	3914.26	4018.84	4126.09	4236.22	4349.40	4465.85	4585.80	29
30	3616.74	3714.20	3813.90	3915.99	4020.60	4127.90	4238.08	4351.31	4467.82	4587.83	30
31	3618.34	3715.84	3815.58	3917.71	4022.37	4129.72	4239.94	4353.23	4469.79	4589.86	31
32	3619.95	3717.48	3817.27	3919.43	4024.13	4131.53	4241.80	4355.14	4471.76	4591.89	32
33	3621.56	3719.13	3818.95	3921.16	4025.90	4133.34	4243.67	4357.06	4473.73	4593.92	33
34	3623.17	3720.77	3820.63	3922.88	4027.67	4135.16	4245.53	4358.97	4475.71	4595.96	34
35	3624.78	3722.42	3822.32	3924.61	4029.44	4136.97	4247.39	4360.89	4477.68	4598.00	35
36	3626.39	3724.06	3824.00	3926.33	4031.21	4138.79	4249.26	4362.81	4479.66	4600.03	36
37	3628.00	3725.71	3825.69	3928.06	4032.98	4140.61	4251.13	4364.73	4481.63	4602.07	37
38	3629.61	3727.36	3827.37	3929.79	4034.75	4142.42	4252.99	4366.65	4483.61	4604.11	38
39	3631.22	3729.01	3829.06	3931.51	4036.52	4144.24	4254.86	4368.57	4485.59	4606.15	39
40	3632.83	3730.66	3830.75	3933.24	4038.29	4146.06	4256.73	4370.50	4487.57	4608.19	40
41	3634.44	3732.30	3832.43	3934.97	4040.07	4147.88	4258.60	4372.42	4489.55	4610.23	41
42	3636.06	3733.95	3834.12	3936.70	4041.84	4149.70	4260.47	4374.34	4491.53	4612.27	42
43	3637.67	3735.61	3835.81	3938.43	4043.61	4151.52	4262.34	4376.27	4493.51	4614.32	43
44	3639.28	3737.26	3837.50	3940.16	4045.39	4153.35	4264.22	4378.20	4495.50	4616.36	44
45	3640.90	3738.91	3839.19	3941.90	4047.17	4155.17	4266.09	4380.12	4497.48	4618.41	45
46	3642.51	3740.56	3840.88	3943.63	4048.94	4157.00	4267.97	4382.05	4499.47	4620.45	46
47	3644.13	3742.21	3842.58	3945.36	4050.72	4158.82	4269.84	4383.98	4501.45	4622.50	47
48	3645.75	3743.87	3844.27	3947.10	4052.50	4160.65	4271.72	4385.91	4503.44	4624.55	48
49	3647.36	3745.52	3845.96	3948.83	4054.28	4162.47	4273.59	4387.84	4505.43	4626.60	49
50	3648.98	3747.18	3847.66	3950.57	4056.06	4164.30	4275.47	4389.77	4507.42	4628.65	50
51	3650.60	3748.83	3849.35	3952.31	4057.84	4166.13	4277.35	4391.70	4509.41	4630.71	51
52	3652.22	3750.49	3851.05	3954.04	4059.62	4167.96	4279.23	4393.64	4511.40	4632.76	52
53	3653.84	3752.15	3852.75	3955.78	4061.41	4169.79	4281.11	4395.57	4513.39	4634.81	53
54	3655.46	3753.80	3854.44	3957.52	4063.19	4171.62	4282.99	4397.51	4515.39	4636.87	54
55	3657.08	3755.46	3856.14	3959.26	4064.97	4173.45	4284.87	4399.44	4517.38	4638.93	55
56	3658.70	3757.12	3857.84	3961.00	4066.76	4175.28	4286.76	4401.38	4519.38	4640.98	56
57	3660.32	3758.78	3859.54	3962.74	4068.54	4177.12	4288.64	4403.32	4521.37	4643.04	57
58	3661.95	3760.44	3861.24	3964.48	4070.33	4178.95	4290.53	4405.26	4523.37	4645.10	58
59	3663.57	3762.10	3862.94	3966.22	4072.12	4180.78	4292.41	4407.20	4525.37	4647.16	59
60	3665.19	3763.76	3864.64	3967.97	4073.90	4182.62	4294.30	4409.14	4527.37	4649.23	60

The Anti-Gudermannian.

gd u	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	gd u
0	4649.23	4774.98	4904.94	5030.42	5178.81	5323.51	5474.01	5630.82	5794.56	5965.92	0
1	4651.29	4777.11	4907.14	5041.70	5181.18	5325.97	5476.57	5633.49	5797.35	5968.84	1
2	4653.35	4779.25	4909.35	5043.99	5183.54	5328.43	5479.13	5636.16	5800.14	5971.77	2
3	4655.42	4781.38	4911.55	5046.27	5185.91	5330.90	5481.69	5638.84	5802.94	5974.70	3
4	4657.49	4783.51	4913.76	5048.56	5188.29	5333.36	5484.26	5641.51	5805.74	5977.63	4
5	4659.55	4785.65	4915.97	5050.85	5190.66	5335.83	5486.83	5644.19	5808.54	5980.57	5
6	4661.62	4787.79	4918.18	5053.14	5193.03	5338.30	5489.40	5646.87	5811.34	5983.50	6
7	4663.69	4789.92	4920.39	5055.43	5195.41	5340.77	5491.97	5649.56	5814.15	5986.44	7
8	4665.76	4792.06	4922.60	5057.72	5197.79	5343.24	5494.54	5652.24	5816.95	5989.38	8
9	4667.83	4794.20	4924.81	5060.01	5200.17	5345.71	5497.11	5654.93	5819.76	5992.33	9
10	4669.91	4796.34	4927.03	5062.30	5202.55	5348.18	5499.69	5657.61	5822.57	5995.27	10
11	4671.98	4798.49	4929.24	5064.60	5204.93	5350.66	5502.27	5660.30	5825.39	5998.22	11
12	4674.05	4800.63	4931.46	5066.90	5207.31	5353.14	5504.85	5663.00	5828.20	6001.17	12
13	4676.13	4802.77	4933.68	5069.19	5209.70	5355.61	5507.43	5665.69	5831.02	6004.13	13
14	4678.21	4804.92	4935.90	5071.49	5212.08	5358.09	5510.01	5668.38	5833.84	6007.08	14
15	4680.29	4807.07	4938.12	5073.80	5214.47	5360.58	5512.60	5671.08	5836.66	6010.04	15
16	4682.37	4809.21	4940.34	5076.10	5216.85	5363.06	5515.18	5673.78	5839.48	6013.00	16
17	4684.45	4811.36	4942.57	5078.40	5219.25	5365.55	5517.77	5676.48	5842.31	6015.96	17
18	4686.53	4813.51	4944.79	5080.71	5221.64	5368.03	5520.36	5679.19	5845.13	6018.93	18
19	4688.61	4815.67	4947.02	5083.01	5224.04	5370.52	5522.95	5681.89	5847.96	6021.90	19
20	4690.70	4817.82	4949.24	5085.32	5226.43	5373.01	5525.55	5684.60	5850.79	6024.87	20
21	4692.78	4819.97	4951.47	5087.63	5228.83	5375.50	5528.14	5687.31	5853.63	6027.84	21
22	4694.87	4822.13	4953.70	5089.94	5231.23	5378.00	5530.74	5690.02	5856.47	6030.81	22
23	4696.96	4824.29	4955.91	5092.25	5233.63	5380.49	5533.34	5692.73	5859.31	6033.79	23
24	4699.05	4826.44	4958.17	5094.57	5236.03	5382.99	5535.91	5695.45	5862.15	6036.77	24
25	4701.14	4828.60	4960.40	5096.88	5238.43	5385.49	5538.55	5698.17	5864.99	6039.75	25
26	4703.23	4830.76	4962.64	5099.20	5240.84	5387.99	5541.15	5700.89	5867.84	6042.74	26
27	4705.32	4832.93	4964.87	5101.52	5243.24	5390.49	5543.76	5703.61	5870.69	6045.73	27
28	4707.41	4835.09	4967.11	5103.84	5245.65	5392.99	5546.37	5706.33	5873.54	6048.72	28
29	4709.51	4837.25	4969.35	5106.16	5248.06	5395.50	5548.98	5709.06	5876.39	6051.71	29
30	4711.60	4839.42	4971.59	5108.48	5250.47	5398.01	5551.59	5711.78	5879.24	6054.70	30
31	4713.70	4841.58	4973.83	5110.80	5252.88	5400.52	5554.20	5714.51	5882.10	6057.70	31
32	4715.79	4843.75	4976.08	5113.13	5255.30	5403.03	5556.82	5717.25	5884.96	6060.70	32
33	4717.89	4845.92	4978.32	5115.45	5257.71	5405.54	5559.41	5719.98	5887.82	6063.71	33
34	4719.99	4848.09	4980.57	5117.78	5260.13	5408.05	5562.05	5722.71	5890.68	6066.71	34
35	4722.09	4850.26	4982.82	5120.11	5262.55	5410.57	5564.68	5725.45	5893.55	6069.71	35
36	4724.19	4852.43	4985.06	5122.44	5264.97	5413.08	5567.30	5728.19	5896.41	6072.72	36
37	4726.30	4854.61	4987.31	5124.77	5267.39	5415.60	5569.93	5730.93	5899.28	6075.73	37
38	4728.40	4856.78	4989.56	5127.11	5269.81	5418.12	5572.55	5733.68	5902.15	6078.75	38
39	4730.51	4858.96	4991.82	5129.44	5272.23	5420.64	5575.18	5736.42	5905.03	6081.76	39
40	4732.61	4861.13	4994.07	5131.78	5274.66	5423.17	5577.81	5739.17	5907.90	6084.78	40
41	4734.72	4863.31	4996.32	5134.11	5277.09	5425.69	5580.44	5741.92	5910.78	6087.81	41
42	4736.83	4865.49	4998.58	5136.45	5279.52	5428.22	5583.08	5744.67	5913.67	6090.83	42
43	4738.94	4867.67	5000.84	5138.79	5281.95	5430.75	5585.71	5747.43	5916.55	6093.86	43
44	4741.05	4869.86	5003.10	5141.14	5284.38	5433.28	5588.35	5750.18	5919.44	6096.89	44
45	4743.16	4872.04	5005.36	5143.48	5286.82	5435.81	5590.99	5752.94	5922.32	6099.92	45
46	4745.28	4874.22	5007.62	5145.83	5289.25	5438.35	5593.61	5755.70	5925.22	6102.95	46
47	4747.39	4876.41	5009.88	5148.17	5291.69	5440.88	5596.28	5758.46	5928.11	6105.99	47
48	4749.51	4878.60	5012.15	5150.52	5294.13	5443.42	5598.93	5761.23	5931.00	6109.03	48
49	4751.63	4880.79	5014.41	5152.87	5296.57	5445.96	5601.57	5763.99	5933.90	6112.07	49
50	4753.74	4882.98	5016.68	5155.22	5299.01	5448.50	5604.22	5766.76	5936.80	6115.12	50
51	4755.86	4885.17	5018.94	5157.57	5301.45	5451.05	5606.87	5769.53	5939.70	6118.16	51
52	4757.98	4887.36	5021.21	5159.93	5303.90	5453.59	5609.53	5772.31	5942.61	6121.21	52
53	4760.10	4889.55	5023.48	5162.28	5306.34	5456.14	5612.18	5775.08	5945.51	6124.26	53
54	4762.23	4891.75	5025.76	5164.64	5308.79	5458.68	5614.84	5777.86	5948.42	6127.32	54
55	4764.35	4893.94	5028.03	5167.00	5311.24	5461.23	5617.50	5780.64	5951.33	6130.38	55
56	4766.47	4896.14	5030.30	5169.36	5313.69	5463.78	5620.16	5783.42	5954.24	6133.44	56
57	4768.60	4898.34	5032.58	5171.72	5316.15	5466.34	5622.82	5786.20	5957.16	6136.50	57
58	4770.73	4900.54	5034.86	5174.08	5318.60	5468.89	5625.49	5788.98	5960.08	6139.56	58
59	4772.86	4902.74	5037.14	5176.44	5321.06	5471.45	5628.15	5791.77	5963.00	6142.63	59
60	4774.98	4904.94	5039.42	5178.81	5323.51	5474.01	5630.82	5794.56	5965.92	6145.70	60

The Anti-Gudermannian.

gd u	71°	72°	73°	74°	75°	76°	77°	78°	79°	80°	gd u
0'	6145.70	6334.84	6534.42	6745.74	6970.34	7210.07	7467.21	7744.57	8045.71	8375.20	0'
1	6148.77	6338.08	6537.85	6749.37	6974.20	7214.20	7471.66	7749.38	8050.95	8380.06	1
2	6151.85	6341.32	6541.27	6753.01	6978.07	7218.35	7476.11	7754.20	8056.20	8386.73	2
3	6154.93	6344.56	6544.70	6756.64	6981.95	7222.49	7480.57	7759.02	8061.46	8392.52	3
4	6158.01	6347.81	6548.13	6760.28	6985.83	7226.64	7485.03	7763.85	8066.73	8398.31	4
5	6161.09	6351.06	6551.57	6763.93	6989.71	7230.80	7489.50	7768.70	8072.01	8404.11	5
6	6164.18	6354.31	6555.01	6767.58	6993.60	7234.96	7493.98	7773.55	8077.20	8409.92	6
7	6167.27	6357.56	6558.45	6771.23	6997.49	7239.12	7498.47	7778.40	8082.58	8415.74	7
8	6170.34	6360.82	6561.89	6774.89	7001.38	7243.29	7502.95	7783.26	8087.88	8421.57	8
9	6173.45	6364.08	6565.31	6778.55	7005.28	7247.47	7507.44	7788.12	8093.19	8427.42	9
10	6176.55	6367.35	6568.79	6782.21	7009.19	7251.65	7511.94	7793.00	8098.51	8433.27	10
11	6179.65	6370.61	6572.23	6785.88	7013.10	7255.83	7516.43	7797.88	8103.83	8439.13	11
12	6182.75	6373.88	6575.70	6789.55	7017.01	7260.02	7520.96	7802.76	8109.17	8445.00	12
13	6185.85	6377.16	6579.16	6793.22	7020.93	7264.22	7525.47	7807.66	8114.51	8450.88	13
14	6188.96	6380.43	6582.63	6796.90	7024.85	7268.42	7530.00	7812.56	8119.86	8456.77	14
15	6192.07	6383.71	6586.10	6800.58	7028.77	7272.62	7534.53	7817.46	8125.22	8462.67	15
16	6195.18	6386.99	6589.57	6804.27	7032.70	7276.83	7539.06	7822.38	8130.58	8468.58	16
17	6198.30	6390.28	6593.05	6807.96	7036.61	7281.05	7543.60	7827.30	8135.95	8474.50	17
18	6201.42	6393.57	6596.52	6811.65	7040.58	7285.27	7548.15	7832.23	8141.33	8480.43	18
19	6204.54	6396.87	6600.01	6815.35	7044.52	7289.49	7552.70	7837.16	8146.72	8486.37	19
20	6207.65	6400.15	6603.49	6819.05	7048.47	7293.72	7557.26	7842.10	8152.12	8492.32	20
21	6210.78	6403.44	6606.98	6822.75	7052.42	7297.96	7561.82	7847.05	8157.53	8498.28	21
22	6213.91	6406.74	6610.47	6826.46	7056.37	7302.20	7566.39	7852.01	8162.95	8504.25	22
23	6217.04	6410.05	6613.96	6830.18	7060.33	7306.44	7570.96	7856.97	8168.37	8510.23	23
24	6220.18	6413.35	6617.46	6833.89	7064.30	7310.69	7575.51	7861.94	8173.80	8516.22	24
25	6223.31	6416.66	6620.97	6837.61	7068.27	7314.95	7580.13	7866.91	8179.24	8522.22	25
26	6226.45	6419.97	6624.47	6841.34	7072.24	7319.21	7584.72	7871.90	8184.69	8528.23	26
27	6229.59	6423.29	6627.98	6845.07	7076.22	7323.47	7589.32	7876.89	8190.15	8534.26	27
28	6232.74	6426.61	6631.49	6848.80	7080.20	7327.74	7593.93	7881.89	8195.61	8540.29	28
29	6235.88	6429.93	6635.01	6852.53	7084.19	7332.02	7598.54	7886.89	8201.09	8546.33	29
30	6239.04	6433.25	6638.53	6856.27	7088.18	7336.30	7603.16	7891.91	8206.57	8552.38	30
31	6242.19	6436.58	6642.05	6860.02	7092.18	7340.55	7607.78	7896.93	8212.06	8558.45	31
32	6245.35	6439.91	6645.58	6863.77	7096.18	7344.88	7612.41	7901.95	8217.56	8564.52	32
33	6248.50	6443.24	6649.11	6867.52	7100.18	7349.18	7617.04	7906.98	8223.07	8570.61	33
34	6251.67	6446.58	6652.64	6871.27	7104.19	7353.48	7621.68	7912.03	8228.59	8576.70	34
35	6254.83	6449.92	6656.18	6875.03	7108.21	7357.79	7626.33	7917.08	8234.12	8582.81	35
36	6258.00	6453.26	6659.72	6878.80	7112.23	7362.10	7630.99	7922.13	8239.66	8588.93	36
37	6261.17	6456.61	6663.26	6882.56	7116.25	7366.42	7635.65	7927.19	8245.20	8595.06	37
38	6264.34	6459.95	6666.81	6886.34	7120.28	7370.74	7640.31	7932.26	8250.75	8601.20	38
39	6267.51	6463.31	6670.36	6890.11	7124.31	7375.07	7644.98	7937.34	8256.31	8607.35	39
40	6270.69	6466.66	6673.91	6893.89	7128.35	7379.40	7649.66	7942.43	8261.88	8613.51	40
41	6273.87	6470.02	6677.47	6897.68	7132.39	7383.74	7654.35	7947.52	8267.45	8619.68	41
42	6277.05	6473.38	6681.03	6901.46	7136.43	7388.08	7659.04	7952.62	8273.05	8625.85	42
43	6280.24	6476.74	6684.59	6905.25	7140.48	7392.43	7663.74	7957.72	8278.65	8632.05	43
44	6283.43	6480.11	6688.16	6909.05	7144.51	7396.79	7668.41	7962.84	8284.24	8638.26	44
45	6286.62	6483.48	6691.73	6912.85	7148.60	7401.15	7673.15	7967.96	8289.87	8644.47	45
46	6289.82	6486.86	6695.31	6916.65	7152.67	7405.51	7677.87	7973.09	8295.49	8650.70	46
47	6293.01	6490.23	6698.89	6920.46	7156.74	7409.88	7682.59	7978.23	8301.12	8656.94	47
48	6296.21	6493.61	6702.47	6924.27	7160.81	7414.26	7687.32	7983.37	8306.77	8663.19	48
49	6299.42	6497.00	6706.06	6928.09	7164.89	7418.61	7692.05	7988.52	8312.42	8669.45	49
50	6302.62	6500.38	6709.65	6931.91	7168.97	7423.03	7696.79	7993.68	8318.08	8675.72	50
51	6305.83	6503.77	6713.24	6935.73	7173.06	7427.42	7701.54	7998.85	8323.75	8682.00	51
52	6309.04	6507.17	6716.81	6939.56	7177.15	7431.82	7706.30	8004.03	8329.43	8688.29	52
53	6312.26	6510.56	6720.44	6943.40	7181.25	7436.22	7711.06	8009.21	8335.12	8694.60	53
54	6315.48	6513.96	6724.04	6947.23	7185.35	7440.63	7715.83	8014.40	8340.82	8700.92	54
55	6318.70	6517.36	6727.65	6951.07	7189.46	7445.05	7720.60	8019.60	8346.54	8707.25	55
56	6321.92	6520.77	6731.26	6954.92	7193.57	7449.47	7725.38	8024.81	8352.22	8713.59	56
57	6325.14	6524.18	6734.88	6958.77	7197.69	7453.89	7730.17	8030.02	8357.96	8719.94	57
58	6328.37	6527.59	6738.50	6962.62	7201.81	7458.33	7734.96	8035.24	8363.70	8726.30	58
59	6331.61	6531.01	6742.12	6966.48	7205.94	7462.76	7739.76	8040.47	8369.44	8732.68	59
60	6334.84	6534.42	6745.74	6970.34	7210.07	7467.21	7744.57	8045.71	8375.20	8739.06	60

# The Anti-Endomannian.

pt. n	81 <sup>a</sup>	82 <sup>a</sup>	83 <sup>a</sup>	84 <sup>a</sup>	85 <sup>a</sup>	86 <sup>a</sup>	87 <sup>a</sup>	88 <sup>a</sup>	89 <sup>a</sup>	pt. n
17	8739.06	0145.46	0005.83	0010.89	0061.62	0131.52	0153.11	0101.41	0099.59	17
1	8735.46	0151.66	0011.03	0016.00	0077.11	0136.83	0151.47	01015.50	0052.41	1
2	8731.87	0150.83	0011.17	0016.07	0078.05	0136.31	0150.53	01027.12	0041.11	2
3	8728.30	0167.08	0010.52	0005.20	0090.32	01378.56	0152.01	01003.45	00425.00	3
4	8701.23	0171.33	0008.50	00175.47	0030.83	01300.31	0153.00	01011.00	0153.70	4
5	8721.17	0181.57	0017.00	0085.05	0032.17	01601.05	01500.00	01002.77	0058.00	5
6	8727.63	0188.81	0055.40	0091.27	0054.16	0160.60	0158.20	01002.36	0001.25	6
7	8734.10	0106.13	0001.24	0004.51	0015.80	01611.30	0163.51	01011.00	0070.00	7
8	8700.58	0203.43	0073.00	0014.38	0057.06	0160.00	01678.46	01033.00	0000.33	8
9	8707.08	0101.71	0081.17	0011.00	0050.90	01601.00	01608.52	01031.00	0083.50	9
10	8803.58	0103.07	0088.50	0013.00	0088.11	01608.03	01708.00	01011.00	0000.00	10
11	8810.10	0105.11	0007.38	0013.25	0083.30	01603.01	01708.08	01012.00	0001.31	11
12	8816.63	0113.27	0005.71	0013.04	0086.13	01708.00	01700.30	01013.20	01000.00	12
13	8813.12	0110.15	0014.12	0003.51	0017.10	01721.11	01720.00	01010.00	01010.00	13
14	8836.73	0117.51	0017.01	0073.48	0000.11	01730.30	01800.58	01011.00	01011.00	14
15	8846.30	0151.05	0211.14	0083.43	0011.17	01731.56	01811.30	01013.50	01013.50	15
16	8812.88	0101.37	0210.66	0093.45	0053.26	01700.88	01811.30	01013.50	01013.50	16
17	8810.12	0100.30	0210.30	0093.40	0005.40	01705.27	01806.30	01013.00	01013.00	17
18	8806.02	0277.37	0230.70	0031.53	0027.50	01800.23	01881.10	01013.00	01013.00	18
19	8803.60	0181.21	0205.31	0013.01	0080.81	01806.26	01805.75	01010.00	01010.00	19
20	8800.31	0103.33	0273.01	0031.73	0002.08	01811.87	01807.73	01013.00	01013.00	20
21	8825.05	0100.73	0283.57	0013.83	0014.40	01817.53	01805.73	01013.00	01013.00	21
22	8831.01	0102.35	0201.31	0031.03	0000.75	01803.38	01800.11	01012.20	01012.20	22
23	8830.30	0111.20	0200.88	0010.31	0000.13	01820.10	01803.37	01010.00	01010.00	23
24	8805.02	0111.11	0180.57	0017.17	0001.00	01801.00	01801.25	01010.00	01010.00	24
25	8800.06	0130.01	0117.35	0081.21	0001.00	01800.06	01800.00	01010.00	01010.00	25
26	8800.37	0137.40	0136.03	0095.03	0070.03	01800.00	01800.00	01010.00	01010.00	26
27	8806.00	0143.00	0141.27	0095.43	0080.21	01803.10	01801.00	01010.00	01010.00	27
28	8803.81	0135.73	0143.55	0015.21	0101.81	01800.20	01801.00	01010.00	01010.00	28
29	8800.57	0100.35	0130.35	0010.00	0111.31	01805.55	01800.27	01010.00	01010.00	29
30	8806.33	0103.00	0100.17	0090.50	01127.21	01801.00	01800.00	01010.00	01010.00	30
31	8813.10	0175.67	0130.11	0010.00	0110.01	01808.31	01724.13	01010.00	01010.00	31
32	8801.88	0133.30	0133.83	0157.11	0103.31	01803.81	01803.81	01010.00	01010.00	32
33	8806.68	0101.00	0132.77	0007.05	0100.00	01801.40	01801.00	01010.00	01010.00	33
34	8803.40	0108.70	0130.60	0078.50	0103.10	01803.08	01801.00	01010.00	01010.00	34
35	8800.31	0100.33	0100.03	0090.03	0100.50	01804.20	01800.00	01010.00	01010.00	35
36	8827.16	0111.33	0011.50	0090.00	0101.37	01801.60	01800.30	01010.00	01010.00	36
37	8801.01	0113.03	0010.33	0017.63	0101.51	01803.51	01803.42	01010.00	01010.00	37
38	8800.82	0110.81	0013.52	0010.01	0100.71	01805.40	01803.00	01010.00	01010.00	38
39	8807.25	0117.05	0011.00	0011.21	0101.00	01811.57	01801.00	01010.00	01010.00	39
40	8801.03	0113.43	0010.60	0015.43	01027.11	01800.73	01800.00	01010.00	01010.00	40
41	8811.33	0153.32	0050.73	0053.33	0120.37	01806.06	01811.00	01010.00	01010.00	41
42	8803.47	0101.03	0048.53	0001.03	0101.03	01801.50	01803.00	01010.00	01010.00	42
43	8805.41	0100.00	0027.00	0054.83	01027.01	01811.71	01810.00	01010.00	01010.00	43
44	8803.30	0106.06	0032.11	0085.20	0100.40	01800.21	01800.00	01010.00	01010.00	44
45	8800.31	0181.82	0000.33	0090.02	0101.03	01806.31	01811.43	01010.00	01010.00	45
46	8816.20	0101.31	0000.03	0007.62	0102.45	01801.30	01802.00	01010.00	01010.00	46
47	8803.23	0100.70	0001.20	0001.00	0101.00	01803.30	01802.23	01010.00	01010.00	47
48	8800.30	0108.73	0001.03	0000.10	0101.65	01800.13	01803.20	01010.00	01010.00	48
49	8807.31	0106.21	0003.21	0010.62	01028.33	01803.01	01801.31	01010.00	01010.00	49
50	8804.31	0151.21	0001.53	0051.23	01002.00	01800.15	01801.00	01010.00	01010.00	50
51	8811.30	0152.21	0051.81	0060.81	01005.85	01804.30	01802.25	01010.00	01010.00	51
52	8808.45	0101.10	0007.01	0010.20	0101.20	01802.51	01800.25	01010.00	01010.00	52
53	8805.53	0103.85	0000.56	0005.22	01013.60	01800.80	01801.48	01010.00	01010.00	53
54	8800.31	0100.03	0007.06	0000.46	01017.50	01800.33	01800.00	01010.00	01010.00	54
55	8807.81	0100.03	0000.33	0007.72	01010.58	01807.87	01800.00	01010.00	01010.00	55
56	8816.81	0153.15	0008.83	0010.03	01075.65	01810.51	01801.08	01010.00	01010.00	56
57	8813.02	0150.20	0008.30	0010.32	01080.73	01805.30	01801.53	01010.00	01010.00	57
58	8813.13	0150.15	0017.81	0011.25	01001.02	01801.10	01800.00	01010.00	01010.00	58
59	8818.28	0107.62	0017.33	0053.17	01018.21	01803.08	01802.00	01010.00	01010.00	59
60	8813.46	0105.82	0010.89	0061.62	01012.52	01803.11	01800.43	01010.00	01010.00	60

SMITHSONIAN TABLES

\* From 83<sup>a</sup> to 89<sup>a</sup> onwards interpolate by second differences.

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TABLE VIII

CONVERSION OF RADIANS INTO ANGULAR MEASURE AND VICE VERSA

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# Conversion of Angular Measure into Radians.

n	Radians for n degrees	Radians for n minutes	Radians for n seconds	n	Radians for n degrees
1	0.01745 32925 2	0.00030 48833 4	0.00000 84823 4	61	1.06919 05437 2
2	0.03490 65850 4	0.00059 97667 2	0.00000 00000 0	62	1.08664 14362 4
3	0.05235 98775 6	0.00087 36400 6	0.00000 45444 6	63	1.10409 23287 6
4	0.06981 31700 8	0.00116 35538 3	0.00000 93055 5	64	1.12154 32212 8
5	0.08726 64626 0	0.00145 44410 4	0.00000 44400 8	65	1.13899 41137 0
6	0.10471 97551 2	0.00174 53292 5	0.00000 60883 2	66	1.15644 50062 2
7	0.12217 30476 4	0.00203 62174 6	0.00000 87799 6	67	1.17389 58987 4
8	0.13962 63401 6	0.00232 71056 7	0.00000 52700 9	68	1.19134 67912 6
9	0.15707 96326 8	0.00260 79938 8	0.00000 30433 3	69	1.20879 76837 8
10	0.17453 29252 0	0.00289 88820 9	0.00000 34654 7	70	1.22624 85762 0
11	0.19198 62177 2	0.00318 97702 0	0.00000 34205 0	71	1.24369 94687 2
12	0.20944 95102 4	0.00347 06585 0	0.00000 30770 4	72	1.26114 03612 4
13	0.22689 38027 6	0.00376 15467 1	0.00000 30227 8	73	1.27859 12537 6
14	0.24434 70952 8	0.00405 24349 2	0.00000 28730 2	74	1.29604 21462 8
15	0.26179 03878 0	0.00434 33231 3	0.00000 27230 5	75	1.31349 30387 0
16	0.27924 36803 2	0.00463 42113 4	0.00000 25730 9	76	1.33094 39312 2
17	0.29669 69728 4	0.00492 50995 5	0.00000 24231 3	77	1.34839 48237 4
18	0.31414 02653 6	0.00521 59877 6	0.00000 22731 6	78	1.36584 57162 6
19	0.33159 35578 8	0.00550 68759 6	0.00000 21231 0	79	1.38329 66087 8
20	0.34904 68504 0	0.00579 77641 7	0.00000 19731 4	80	1.40074 75012 0
21	0.36649 01429 2	0.00608 86523 8	0.00000 18231 7	81	1.41819 83937 2
22	0.38394 34354 4	0.00637 95405 9	0.00000 16732 1	82	1.43564 92862 4
23	0.40139 67279 6	0.00667 04287 0	0.00000 15232 5	83	1.45309 01787 6
24	0.41884 00204 8	0.00696 13169 1	0.00000 13732 8	84	1.47054 10712 8
25	0.43629 33130 0	0.00725 22051 2	0.00000 12233 2	85	1.48799 19637 0
26	0.45374 66055 2	0.00754 30933 3	0.00000 10733 6	86	1.50544 28562 2
27	0.47119 98980 4	0.00783 39815 4	0.00000 9234 0	87	1.52289 37487 4
28	0.48864 31905 6	0.00812 48697 5	0.00000 7734 3	88	1.54034 46412 6
29	0.50609 64830 8	0.00841 57579 6	0.00000 6234 7	89	1.55779 55337 8
30	0.52354 97756 0	0.00870 66461 6	0.00000 4735 0	90	1.57524 64262 0
31	0.54099 30681 2	0.00899 75343 7	0.00000 3235 4	91	1.59269 73187 2
32	0.55844 63606 4	0.00928 84225 8	0.00000 1735 8	92	1.61014 82112 4
33	0.57589 96531 6	0.00957 93107 0	0.00000 0236 1	93	1.62759 91037 6
34	0.59334 29456 8	0.00986 01989 0	0.00000 00000 0	94	1.64504 99962 8
35	0.61079 62382 0	0.01015 10871 1	0.00000 00000 0	95	1.66249 08887 0
36	0.62824 95307 2	0.01044 19753 2	0.00000 00000 0	96	1.67994 17812 2
37	0.64570 28232 4	0.01073 28635 3	0.00000 00000 0	97	1.69739 26737 4
38	0.66315 61157 6	0.01102 37517 4	0.00000 00000 0	98	1.71484 35662 6
39	0.68060 94082 8	0.01131 46399 5	0.00000 00000 0	99	1.73229 44587 8
40	0.69806 27008 0	0.01160 55281 6	0.00000 00000 0	100	1.74974 53512 0
41	0.71551 60033 2	0.01189 64163 7	0.00000 00000 0	101	1.76719 62437 2
42	0.73296 93058 4	0.01218 73045 8	0.00000 00000 0	102	1.78464 71362 4
43	0.75042 26083 6	0.01247 81927 9	0.00000 00000 0	103	1.80209 80287 6
44	0.76787 59108 8	0.01276 90809 0	0.00000 00000 0	104	1.81954 89212 8
45	0.78533 92134 0	0.01305 99691 1	0.00000 00000 0	105	1.83699 98137 0
46	0.80278 25159 2	0.01335 08573 2	0.00000 00000 0	106	1.85444 07062 2
47	0.82023 58184 4	0.01364 17455 3	0.00000 00000 0	107	1.87189 15987 4
48	0.83768 91209 6	0.01393 26337 4	0.00000 00000 0	108	1.88934 24912 6
49	0.85514 24234 8	0.01422 35219 5	0.00000 00000 0	109	1.90679 33837 8
50	0.87259 57260 0	0.01451 44101 6	0.00000 00000 0	110	1.92424 42762 0
51	0.89004 90285 2	0.01480 52983 7	0.00000 00000 0	111	1.94169 51687 2
52	0.90750 23310 4	0.01509 61865 8	0.00000 00000 0	112	1.95914 60612 4
53	0.92495 56335 6	0.01538 70747 9	0.00000 00000 0	113	1.97659 69537 6
54	0.94240 89360 8	0.01567 79629 0	0.00000 00000 0	114	1.99404 78462 8
55	0.95986 22386 0	0.01596 88511 1	0.00000 00000 0	115	2.01149 87387 0
56	0.97731 55411 2	0.01625 97393 2	0.00000 00000 0	116	2.02894 96312 2
57	0.99476 88436 4	0.01655 06275 3	0.00000 00000 0	117	2.04639 05237 4
58	1.01222 21461 6	0.01684 15157 4	0.00000 00000 0	118	2.06384 14162 6
59	1.02967 54486 8	0.01713 24039 5	0.00000 00000 0	119	2.08129 23087 8
60	1.04713 87512 0	0.01742 32921 6	0.00000 00000 0	120	2.09874 32012 0

# Conversion of Radians into Angular Measure.

Radians			Angle			Radians			Angle		
	"	'	"				"	'	"		
0.1	05	43	46.48062	47	0.006	0	20	37.58883	75		
0.2	11	27	32.96121	94	.007		24	03.85361	37		
0.3	17	11	09.44187	41	.008		27	30.11845	00		
0.4	22	55	05.02249	88	.009		30	56.38325	62		
0.5	28	38	52.40312	35	0.0100	0	34	22.64805	25		
0.6	34	22	38.88374	83	.0001	00	00	20.62648	00		
0.7	40	06	25.36437	30	.0002	00	00	41.25296	12		
0.8	45	50	11.84499	77	.0003	01	01	01.87944	19		
0.9	51	33	58.32562	24	.0004	01	01	22.50592	25		
1.00	57	17	44.80621	71	0.0005	01	01	43.13440	31		
0.01	00	31	22.64805	25	.0005		02	03.75888	37		
0.02	01	08	45.29612	49	.0007		02	24.38536	44		
0.03	01	43	07.04488	74	.0008		02	45.01181	50		
0.04	02	17	30.59221	99	.0009		03	05.63832	56		
0.05	02	51	53.24031	24	0.00100	0	03	26.26480	625		
0.06	03	20	45.88377	48	.00001	00	00	02.66264	806		
0.07	04	00	38.53643	73	.00002	00	00	04.12529	612		
0.08	04	35	01.18449	68	.00003	00	00	06.50118	450		
0.09	05	09	24.83356	22	.00004	00	00	08.25059	225		
0.100	05	43	46.48062	47	0.00005	0	00	10.31324	031		
0.001	00	03	20.62648	00	.00006	00	00	12.37588	837		
0.002	00	06	52.50612	25	.00007	00	00	14.43853	644		
0.003	00	10	18.79441	87	.00008	00	00	16.50118	450		
0.004	00	13	45.05922	50	.00009	00	00	18.56383	256		
0.005	00	17	11.32403	12	0.00010	0	00	20.62648	002		

SMITHSONIAN TABLES

## Numerical Constants.

$\log_{10} e = 0.30103 \ 99086 \ 63981$	$\frac{1}{\pi} = 0.31831 \ 49770 \ 07488 \ 12085 \ 17619$
$\log_{10} 2 = 0.30103 \ 99086 \ 63981$	$\frac{1}{\pi^2} = 0.10132 \ 16746 \ 91268 \ 77226 \ 56839$
$\log_{10} 3 = 0.47712 \ 12549 \ 49493 \ 63894 \ 44321$	$\frac{1}{\pi^3} = 0.03141 \ 62914 \ 68320 \ 47996 \ 01341 \ 56019$
$\log_{10} 10 = 1.00000 \ 00000 \ 00000 \ 00000 \ 00000$	$\frac{1}{\pi^4} = 0.00771 \ 49999 \ 59298 \ 39763 \ 60681 \ 25266$
$\log_{10} \pi = 0.49714 \ 98726 \ 94134$	$\frac{1}{\pi^5} = 0.00242 \ 26179 \ 53248 \ 19101 \ 52308 \ 23287$
$\log_{10} e^{\pi} = 1.14472 \ 98585 \ 49460$	$\frac{1}{\pi^6} = 0.00075 \ 08145 \ 93752 \ 62990 \ 66456 \ 81211$
$\frac{1}{\pi} = 0.31831 \ 49770 \ 07488 \ 12085 \ 17619$	$\frac{1}{\pi^7} = 0.00023 \ 23163 \ 64485 \ 42884 \ 10169 \ 27488$
$\pi^2 = 9.86960 \ 44010 \ 89359$	$\frac{1}{\pi^8} = 7.24308 \ 17314 \ 56888 \ 60711 \ 56314 \ 42696 \ 53417 \ 82425$
$\frac{1}{\pi^2} = 0.10132 \ 16746 \ 91268 \ 77226 \ 56839$	$\frac{1}{\pi^9} = 0.00023 \ 23163 \ 64485 \ 42884 \ 10169 \ 27488$
$\frac{1}{\pi^3} = 0.03141 \ 62914 \ 68320 \ 47996 \ 01341 \ 56019$	$\frac{1}{\pi^{10}} = 7.24308 \ 17314 \ 56888 \ 60711 \ 56314 \ 42696 \ 53417 \ 82425$
$\frac{1}{\pi^4} = 0.00771 \ 49999 \ 59298 \ 39763 \ 60681 \ 25266$	$\log_{10} 206264.80625 = 5.31442 \ 51332$
$\frac{1}{\pi^5} = 0.00242 \ 26179 \ 53248 \ 19101 \ 52308 \ 23287$	
$\frac{1}{\pi^6} = 0.00075 \ 08145 \ 93752 \ 62990 \ 66456 \ 81211$	
$\frac{1}{\pi^7} = 0.00023 \ 23163 \ 64485 \ 42884 \ 10169 \ 27488$	
$\frac{1}{\pi^8} = 7.24308 \ 17314 \ 56888 \ 60711 \ 56314 \ 42696 \ 53417 \ 82425$	

SMITHSONIAN TABLES